171049
1/13/03
ES

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 5

IN THE MATTER OF: Southeast Rockford Groundwater Site Hamilton Sundstrand Corp. RESPONDENT. Proceeding Under Sections 104, 122(a), and 122(d)(3) of the Comprehensive Environmental Response, Compensation, and Liability Act as amended (42 U.S.C. Sections 9604, 9622(a), 9622(d)(3)).	U.S. EPA Docket No. V-W-03-C-729

ADMINISTRATIVE ORDER ON CONSENT
FOR REMEDIAL DESIGN

The United States Environmental Protection Agency ("EPA") and Respondent have agreed to the making and entry of this Administrative Order on Consent ("Consent Order").

I. JURISDICTION

A. This Consent Order is issued pursuant to the authority vested in the President of the United States by Sections 104, 122(a) and 122(d)(3) of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), as amended, 42 USC §§ 9604, 9622(a), 9622(d)(3). This authority was delegated to the Administrator of EPA on January 23, 1987, by Executive Order 12580, 52 Fed. Reg. 2926 (1987), and further delegated to Regional Administrators as of January 16, 2002, by U.S. EPA Delegation Nos. 14-1 and 14-2, and to the Director, Superfund Division, Region 5, by Regional Delegation Nos. 14-1 and 14-2.

B. Respondent agrees to undertake all actions required by the terms and conditions of this Consent Order.

C. Solely for the purposes of this Consent Order, the

Respondent consents to and agrees not to contest EPA's jurisdiction to issue or enforce the terms of this Consent Order. Provided however, Respondent does not admit, accept, concede, acknowledge, and specifically denies the determinations, allegations, findings of fact, and conclusions of law made by EPA in this Consent Order and specifically reserves the right to contest any such determinations, allegations, findings, and conclusions in any proceeding regarding the Site in other than actions brought by EPA to enforce this order. Furthermore, the Respondent specifically denies any fault or liability under CERCLA or any other statutory or common law, and does not, by signing this Consent Order, waive any rights it may have to assert claims under CERCLA against any person, as defined in Section 101(21) of CERCLA, 42 U.S.C. § 9601(21), except as precluded by Section XXII, Paragraph A of this Consent Order and Sections IX and X of the Amended Consent Decree (Civil Action No. 98C50026) entered by the United States District Court in January 1999, for the case of United States and the State of Illinois v. City of Rockford, Illinois.

II. NOTICE OF ADMINISTRATIVE ACTION

EPA notified Hamilton Sundstrand Corporation, whom it considers to be a potentially responsible party (PRP) for site Area 9/10 as of the effective date of this Consent Order. Hamilton Sundstrand Corporation is the owner of some but not all of the property within Area 9/10 and was the only party formally notified.

III. PARTIES BOUND

A. This Consent Order shall apply to and be binding upon EPA and shall be binding upon the Respondent, its agents, successors, assigns, officers, directors and principals. The Respondent is jointly and severally responsible for carrying out all actions required of it by this Consent Order. The signatories to this Consent Order certify that they are authorized to execute and legally bind the parties they represent to this Consent Order. No change in the ownership or corporate status of the Respondent or of the facility or site shall alter Respondent's responsibilities under this Consent Order.

B. The Respondent shall provide a copy of this Consent Order to any subsequent owners or successors before ownership rights or stock or assets in a corporate acquisition are

transferred. Respondent shall provide a copy of this Consent Order to all contractors, subcontractors, laboratories, and consultants which are retained to conduct any work performed under this Consent Order, within 14 days after the effective date of this Consent Order or the date of retaining their services, whichever is later. Respondent shall condition any such contracts upon satisfactory compliance with this Consent Order. Notwithstanding the terms of any contract, Respondent is responsible for compliance with this Consent Order and for ensuring that its subsidiaries, employees, contractors, consultants, subcontractors, agents and attorneys comply with this Consent Order.

IV. DEFINITIONS

Unless otherwise specified, terms used in this Consent Order, which are defined in CERCLA or in regulations promulgated under CERCLA, shall have the meaning assigned to them in CERCLA or in such regulations. Whenever terms listed below are used in this Consent Order or in appendices attached hereto, the following definitions shall apply:

"CERCLA" shall mean the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended, 42 USC §§ 9601 et seq.

"Consent Order" shall mean this Order and all appendices attached hereto. In the event of conflict between this Order and any appendix, this Order shall control.

"Day" shall mean a calendar day unless expressly stated to be a working day. "Working day" shall mean a day other than a Saturday, Sunday, or Federal holiday. In computing any period of time under this Consent Order, where the last day would fall on a Saturday, Sunday, or Federal holiday, the period shall run until the close of the next working day.

"EPA" shall mean the United States Environmental Protection Agency and any successor departments or Agencies of the United States.

"IL EPA" or "IEPA" shall mean the Illinois Environmental Protection Agency and any successor department, its employees and authorized representatives.

"National Contingency Plan" or "NCP" shall mean the National Oil and Hazardous Substances Pollution Contingency Plan

promulgated pursuant to Section 105 of CERCLA, 42 USC § 9605, codified at 40 CFR Part 300, including, but not limited to, any amendments thereto.

"Paragraph" shall mean a portion of this Consent Order identified by an arabic numeral or an upper case letter.

"Record of Decision" or "ROD" shall mean the IL EPA/EPA Record of Decision relating to the Remedial Action planned for the Site, including site Area 9/10, signed on June 11, 2002, by the Superfund Division Director, EPA Region 5, and all attachments thereto, to be attached as Appendix A.

"Remedial Design" shall mean those activities, including pre-design studies, to be undertaken by Respondent to develop the final plans and specifications for Remedial Action pursuant to the Record of Decision, the Statement of Work, Pre-Design Work Plan and the Remedial Design Work Plan, the document submitted by Respondent pursuant to Section VIII of this Consent Order (Work to be Performed).

"Remedial Project Manager" or "RPM" shall mean the individual responsible for overseeing the implementation of the Remedial Design on behalf of the EPA and who shall be vested with all the powers permitted by the NCP.

"Section" shall mean a portion of this Consent Order identified by a roman numeral.

"Site" shall mean the Area 9/10 portion of the Southeast Rockford Groundwater Superfund site, as identified in the June 11, 2002 ROD, an industrial area in Rockford, Winnebago County, Illinois, that is bounded by Eleventh Street on the east, Twenty-third Avenue on the north, Harrison Avenue on the south, and Sixth Street on the west, and is depicted on the map attached as Appendix B.

"State" shall mean the State of Illinois.

"Statement of Work" or "SOW" shall mean the statement of work for implementation of Remedial Design as set forth in Appendix C to this Consent Order and any modifications made in accordance with this Consent Order.

"United States" shall mean the United States of America.

"Work" shall mean all activities Respondent is required to perform under this Consent Order, except those required by

Section XXVI (Record Preservation).

V. STATEMENT OF PURPOSE

A. The mutual objectives of EPA and Respondent in entering into this Consent Order, are: (1) to protect human health, welfare and the environment at site Area 9/10 by performance of the Remedial Design for Remedial Action; and (2) to recover response and oversight costs incurred by EPA with respect to the previous and present work conducted at site Area 9/10.

B. The activities conducted pursuant to this Consent Order are subject to approval by EPA. Respondent shall employ sound scientific, engineering, and construction practices and all activities undertaken shall be consistent with CERCLA, the NCP, and other applicable laws.

C. EPA and Respondent each recognize that Respondent is undertaking RD work for all of Area 9/10 and is settling all RD response and oversight costs for Area 9/10 through this Consent Order.

VI. FINDINGS OF FACT

Based on available information, including the Administrative Record in this matter, EPA hereby finds, and, for purposes of enforceability of this Consent Order only, the Respondent stipulates that the factual statutory prerequisites under CERCLA necessary for issuance of this Consent Order have been met. EPA's findings and this stipulation include the following:

A. The overall Southeast Rockford Groundwater Site is located in Rockford, Winnebago County, Illinois and consists of an approximately 3 square mile area. Site Area 9/10 is located in an area bounded by Eleventh Street on the east, Twenty-third Avenue on the north, Harrison Avenue on the south, and Sixth Street on the west. Respondent's Rockford, Illinois facility is located in the approximate center of Site Area 9/10. Site Area 9/10 is generally depicted in a map attached as Appendix B.

B. Site Area 9/10 has a long history of industrial activity extending back to approximately 1926. At that time, the Rockford Milling Machine and Rockford Tool Companies merged to become the Sundstrand Machine Tool Company which is located at the northwest corner of 11th Street and Harrison Avenue in

Rockford, Illinois, in area 9/10.

C. According to previous investigations, an outdoor drum storage area associated with the former Sundstrand Plant #2 was located at the southwest corner of the Sundstrand parking lot (9th Street and 23rd Avenue - in area 9/10). Between 1962 and 1985, various 55-gallon drums of VOC-bearing materials including tetrachloroethene, 1,1,1-trichloroethane (TCA), toluene, acetone and methylene chloride were stored in this area.

D. Between approximately 1962 and 1987, Sundstrand also reportedly maintained approximately 14 underground storage tanks (USTs) at its Sundstrand Plant #1 dock area in area 9/10. The USTs were constructed of steel and were used for containing solvents, including perchloroethylene (PCE), TCA, and cleaning solvents.

E. IL EPA records indicate that the geology at site Area 9/10 is unconsolidated sand and gravel between depths of approximately 101 feet below ground surface (bgs) and 235 feet bgs. The water table in site Area 9/10 is encountered at approximately 30-35 feet bgs. The groundwater under site Area 9/10 flows in a southwestern direction.

F. Contaminants of concern that have been found in sampling wells adjacent to or down gradient of site Area 9/10 include: 1,2-dichloroethylene, 1,1-dichloroethane, and vinyl chloride.

G. IL EPA findings have noted surface soil measurements of semi-volatile contaminants of concern and the pesticide dieldrin in amounts in excess of guidelines for humans living at site Area 9/10. Soil gas samplings showed distinctly high soil gas pockets of volatilized contaminants of concern in six (6) separate locations at site Area 9/10: 1) west and northwest of the UT/Sundstrand plant (the southeast corner of 23rd Avenue and 9th Street); 2) immediately south of the UT/Sundstrand plant and in the Rockford Products Co. parking lot; 3) immediately north of the Rockford Products building on 9th Street; 4) at the west end of the Nylint building; 5) at the Mid-States Industrial (inactive operation) facility; and 6) at the intersection of 9th Street and Harrison Avenue.

H. The properties to the immediate north of site Area 9/10, across Twenty-third Avenue, are zoned residential. The properties south of site Area 9/10, across Harrison Avenue, are zoned for both commercial and residential purposes. Site Area

9/10 is zoned as light industrial. Future use plans by the City of Rockford, Illinois appear to follow the same zoning patterns as noted above. The City of Rockford, Illinois, and Winnebago county draw 100% of their water supply from groundwater through private, industrial and municipal supply wells.

I. The overall Southeast Rockford Groundwater Superfund Site was proposed for addition to the National Priorities List (NPL), 40 CFR Part 300, Appendix B, in June 1988, and was listed on March 31, 1989, 54 Fed. Reg. 13,296.

J. The State of Illinois discovered the groundwater problem at the overall Site between 1981 and 1988. In 1989, EPA initiated a Superfund time-critical removal action to place residents whose water wells had VOC levels equal to or greater than 25% of removal action levels under CERCLA, on bottled water as a temporary measure. In December 1989, the same residents received point-of-use carbon filters from EPA. Ultimately, EPA extended water mains and provided service connections for 283 residences as part of the removal action. This action was completed in 1991.

K. Prior to 1991, IL EPA also began work on the Operable Unit One Remedial Investigation/Feasibility Study (RI/FS). EPA and IL EPA developed a proposed plan for Operable Unit One at the overall Site in March 1991. Thereafter, a ROD for Operable Unit One was signed on June 14, 1991. The Operable Unit One ROD required more affected area residences to be hooked into the City of Rockford municipal water system, and for a granular activated carbon water treatment unit to be installed at a Rockford municipal well. Including the previous residences covered by the EPA time-critical removal, by November 1991, 547 residences and homes were hooked up to Rockford municipal water. In December 1992, EPA issued a Remedial Action Report certifying that the selected remedy for Operable Unit One was operational and functional.

L. Beginning in May 1991, IL EPA conducted the RI/FS required for Operable Unit Two. The objective of Operable Unit Two was to characterize the nature and extent of groundwater contamination throughout the Site, and to develop information on the 'source areas' that were responsible for the overall Site. The entire RI/FS was completed by 1994, and IL EPA issued a Proposed Plan for Operable Unit Two in July 1995. The ROD for addressing Operable Unit Two was signed on September 29, 1995. The Operable Unit Two ROD required further water hookups for homes and businesses projected to be in the overall Site area affected by contaminated water; groundwater monitoring for 205

years; and, future source control measures to be developed for the four primary source of contamination areas of the overall Site, including site Area 9/10.

M. In May 1996, IL EPA began performance of the Operable Unit Three RI/FS. The RI/FS involved soil gas sampling, soil borings, well installation and groundwater sampling at site Area 9/10. The results of the Operable Unit Three RI/FS were used to characterize the 4 source areas, including site Area 9/10. These findings and determinations are described in the June 11, 2001 Proposed Plan for the ROD in the 'Description of Source Areas.' IL EPA and EPA hosted a number of public informational meetings during Summer 2001, in order to explain and take comments on the Proposed Plan. During Fall and Winter 2001, IL EPA and EPA prepared Responses to Comments and modified portions of the Proposed Plan in anticipation of issuing a ROD in Spring 2002. The Operable Unit Three ROD was issued on June 11, 2002.

N. In the May 2002 Responsiveness Summary, IL EPA noted that it had modified the leachate remediation goals for each source area to consider background concentrations coming into each of the areas. "Background" concentrations for a source area are concentrations of contaminants that are determined, using procedures defined in the Resource Conservation and Recovery Act (RCRA), to originate upgradient from a specific source. This means that if upgradient groundwater (groundwater coming onto one's property) were determined to be contaminated, allowances would be made in accordance with RCRA to subtract these concentrations from those found in downgradient groundwater when setting remediation goals for a source area. The <u>origin</u> of the contaminants coming into a source area does not have to be determined in order to establish background.

O. EPA and IL EPA enforcement efforts at the overall Site have involved the negotiation and execution of two federal court Consent Decrees (CDs). The first CD was between the federal government and the State of Illinois, and the City of Rockford. This CD required the City of Rockford to maintain, install and expand its water main service and hook ups to homes and businesses within the overall Site area, and to commence long-term well network sampling and analytical activities. The second (amended) CD was between the federal government and the State of Illinois, and the City of Rockford and approximately 150 covenant beneficiaries. The January 1999 amended CD required the City of Rockford and the covenant beneficiaries to pay approximately $9.2 million dollars towards the past costs of the federal and state agencies, and approximately $5.1 million

dollars in a cash out Special Account for future costs at site Area 7. In the January 1999 amended CD, the federal and state governments reserved their rights to take action and recover response costs incurred for source containment at Areas of the overall Site that are sources of contamination of groundwater at the overall Site, excluding site Area 7. In a second amendment to the CD, eleven (11) more covenant beneficiaries settled with the federal and state governments for an additional amount of approximately $142,000. The second amended CD was entered by the court in September 2001.

VII. CONCLUSIONS OF LAW

EPA has determined that:

A. Respondent shall promptly and properly take appropriate response action at the Site by conducting a Remedial Design (RD) and is qualified to perform the RD; and

B. The actions required by this Consent Order are in the public interest and consistent with CERCLA and the NCP.

VIII. WORK TO BE PERFORMED

A. All work performed by Respondent pursuant to this Consent Order shall be under the direction and supervision of qualified personnel. Within 10 days of the effective date of this Consent Order, and before the work outlined below begins, the Respondents shall notify EPA in writing of the names, titles, and qualifications of the personnel, including the proposed project officer, principal contractors, subcontractors, consultants and laboratories to be used in carrying out such work. With respect to any proposed contractor, the Respondent shall demonstrate that the proposed contractor has a quality system which complies with ANSI/ASQC E4-1994, "Specifications and Guidelines for Quality Systems for Environmental Data Collection and Environmental Technology Programs," (American National Standard, January 5, 1995), by submitting a copy of the proposed contractor's Quality Management Plan (QMP). The QMP should be prepared in accordance with "EPA Requirements for Quality Management Plans (QA/R-2)," (EPA/240/B-01/002, March 2001) or equivalent documentation as determined by EPA. The qualifications of the persons undertaking the work for Respondent shall be subject to EPA's review, for verification that such persons meet minimum technical background and experience requirements. This Consent Order is contingent on

Respondent's demonstration to EPA's satisfaction that Respondent's personnel are qualified to perform properly and promptly the actions set forth in this Consent Order. If EPA disapproves in writing of any person's technical qualifications, Respondent shall notify EPA of the identity and qualifications of the replacement within 10 days of the written notice. If EPA subsequently disapproves of the replacement, EPA reserves the right to terminate this Consent Order and to conduct a complete Remedial Design, and to seek reimbursement for costs and penalties from Respondent. During the course of the Remedial Design, Respondent shall notify EPA in writing of any changes or additions in the personnel used to carry out such work, providing their names, titles, and qualifications. EPA shall have the same right to approve changes and additions to personnel as it has hereunder regarding the initial notification. Replacement of any of Respondent's personnel shall not delay performance of the work under this Consent Order.

B. Respondent shall conduct activities and submit deliverables as provided by the attached SOW for performance of the RD, which is incorporated by reference, for the development of the RD. All such work shall be conducted in accordance with CERCLA, the NCP, and EPA guidance referenced in the SOW, as may be amended or modified by EPA. The general activities that Respondent is required to perform are identified below, followed by a list of deliverables. The tasks that Respondent must perform are described more fully in the SOW and guidance. The activities and deliverables identified below shall be developed as provisions in the work plan and sampling and analysis plan, and shall be submitted to EPA as provided. All work performed under this Consent Order shall be in accordance with the schedules herein, and in full accordance with the standards, specifications, and other requirements of the work plan and sampling and analysis plan, as initially approved or modified by EPA, and as may be amended or modified by EPA from time to time. For the purpose of this Consent Order, day means calendar day unless otherwise noted in the Consent Order.

1. RD Work Plan.

Within 30 days of the effective date of this Consent Order, Respondent shall submit to EPA a complete RD Work Plan (WP). If EPA disapproves of or requires revisions to the RD WP, in whole or in part, Respondent shall amend and submit to EPA a revised RD WP which incorporates all EPA comments, within 15 days of receiving EPA's comments.

a. Site Health and Safety Plan Within the time specified

in the RD WP, Respondent shall develop and submit to EPA a Site Health and Safety Plan (HASP). A revised Site HASP (if necessary) shall be provided by Respondent within 15 days of receipt of EPA comments. The Site HASP shall meet all EPA requirements, as described in the SOW and guidances.

b. Sampling and Analysis Plan. Within the time specified in the RD WP, Respondent shall develop and submit to EPA a Sampling and Analysis Plan. This plan shall consist of a field sampling plan (FSP) and a quality assurance project plan (QAPP), as described in the SOW and guidances.

c. Data Evaluation Summary Report. Within the time specified in the RD WP, Respondent shall develop and submit a Data Evaluation Summary Report, as described in the SOW and guidances.

d. Pilot Study Discussion. Within the time specified in the RD WP, Respondent shall arrange for a Pilot Study Discussion, as described in the SOW and guidances.

e. Pilot Test Results Discussion. Within the time specified in the RD WP, Respondent shall arrange for a Pilot Test Results Discussion, as described in the SOW and guidances.

f. Preliminary Design. Within the time specified in the RD WP, Respondent shall develop and submit a Preliminary Remedial Design, as described in the SOW and guidances.

g. Response to Design Review Comments. Within 21 days of the Design Review Meeting, Respondent shall develop and submit a Response to Design Review Comments, as described in the SOW and guidances.

h. List of Long-Lead Procurement Items and Prefinal Design Specifications. Within 21 days of the approval of the Preliminary Design, Respondent shall develop and submit the list of long-lead procurement items, and within 60 days of approval of the Preliminary Design, Respondent shall develop and submit the Prefinal Design Specifications, as described in the SOW and guidances.

i. Prefinal Design Drawings. Within 60 days of the approval of the Preliminary Design, Respondent shall develop and submit the Prefinal Design Drawings, specifications, and design basis, as described in the SOW and guidances.

j. Final (100 Percent) Design. Within 30 days of

receipt of the Prefinal Design comments, Respondent shall develop and submit the Final (100 Percent) Design, as described in the SOW and guidances.

Following approval or modification by EPA, the RD WP is incorporated by reference herein.

2. Community Relations Support. Respondent shall provide any necessary associated community relations support for EPA and IL EPA as described in the SOW.

C. Respondent acknowledges and agrees that nothing in this Consent Order, the SOW, or the Remedial Design constitutes a warranty or representation of any kind by the EPA that compliance with the work requirements set forth in the SOW will achieve the Performance Standards. Respondent's compliance with the work requirements shall not foreclose EPA from seeking compliance with all terms and conditions of this Consent Order.

IX. ADDITIONAL WORK

A. In the event EPA or the Respondent determine that additional work, not otherwise included in the SOW, including remedial investigatory work and engineering evaluation, is necessary to accomplish the objectives of this Consent Order, notification of additional work shall be provided to all parties.

B. Additional work determined to be necessary by Respondent shall be subject to the written approval of EPA.

C. Additional work determined to be necessary by Respondent and approved by EPA, or determined to be necessary by EPA and requested of Respondent, shall be completed by Respondent in accordance with the standards and specifications determined or approved by EPA. Respondent shall propose a schedule for additional work for EPA approval. EPA may modify or determine the schedule for additional work. Additional work shall be performed in a manner consistent with the purposes and objectives of this Consent Order, and conform with the requirements of Section VIII (Work to be Performed).

X. COMPLIANCE WITH APPLICABLE LAWS

A. Respondent shall perform all work under this Consent Order in compliance with applicable federal, state and local

laws, ordinances, or regulations. In the event a conflict arises between these laws, ordinances, or regulations , Respondent shall comply with the more stringent law, ordinance, or regulation, unless otherwise approved by EPA.

B. Respondent shall be responsible for obtaining state and local permits necessary for the performance of any off-site work, and for complying with the substantive provisions of state and local permit regulations for any on-site work. The standards and provisions of Section XIX (Force Majeure) shall govern delays in obtaining such permits.

XI. NOTIFICATION OF OUT-OF-STATE SHIPMENTS

A. In the event of out of state shipments of hazardous substances, Respondent shall provide written notification to EPA, IL EPA and the appropriate environmental official of the state receiving hazardous substances prior to shipment of hazardous substances in quantities greater than ten (10) cubic yards from site Area 9/10 to an out-of-state location. The notification shall include:

1. the name and location of the facility receiving the hazardous substances;

2. the type and quantity of the hazardous substances, including the Department of Transportation shipping code, if any;

3. the schedule for shipment of the hazardous substances;

4. the method of transportation; and

5. Any special procedures necessary to respond to an accidental release of the substances during transportation.

Respondent shall promptly notify EPA, IL EPA and the appropriate environmental official for the receiving state of any changes to the shipment plan.

XII. QUALITY ASSURANCE

A. Respondent shall consult with the RPM in planning all sampling and analysis detailed in the RD WP. Respondent shall assure that work performed, samples taken and analyses conducted

conform to the requirements of the SOW, the QAPP and guidance identified therein. Respondent shall assure that field personnel used by Respondent are properly trained in the use of field equipment and in chain of custody procedures. Respondent shall only use laboratories which have a documented quality system that complies with ANSI/ASQC E4-1994, "Specifications and Guidelines for Quality Systems for Environmental Data Collection and Environmental Technology Programs," (American National Standard, January 5, 1995) and "EPA Requirements for Quality Management Plans (QA/R-2)" (EPA/240/B-01/002, March 2001) or equivalent documentation as determined by EPA. EPA may consider laboratories accredited under the National Environmental Laboratory Accreditation Program (NELAP) to meet the quality system requirements.

B. Respondent shall prepare preliminary and final QAPPs for submittal to EPA according to the schedule in the SOW. Respondent shall participate in a pre-QAPP meeting with EPA prior to submission of the preliminary QAPP to discuss its contents.

C. The QAPPs shall be subject to review, modification, and approval by EPA in accordance with Section XIV (Plans and Reports).

XIII. ACCESS

A. To the extent site Area 9/10 or other areas where work is to be performed is presently owned by parties other than Respondent, Respondent shall obtain, or use its best efforts to obtain, access agreements from the present owners within sixty (60) days of approval of the RD WP. Access agreements shall provide access for EPA, IL EPA, and all authorized representatives of EPA and IL EPA.

B. With necessary escort and at all reasonable times, EPA, IL EPA and their authorized representatives shall have the authority to enter and freely move about all property at site Area 9/10 and off-site areas where work, if any, is being performed, for the purposes of inspecting conditions, activities, the results of activities, records, operating logs, and contracts related to site Area 9/10 or Respondent and its contractor pursuant to this order; reviewing the progress of the Respondent in carrying out the terms of this Consent Order; conducting tests as EPA, IL EPA or its authorized representatives deem necessary; using a camera, sound recording device or other documentary type equipment; and verifying the

data submitted to EPA by Respondent. Respondent shall allow these persons to inspect and copy all records, files, photographs, documents, sampling and monitoring data, and other writings related to work undertaken in carrying out this Consent Order, subject to Section XXV (Access to Information). Nothing herein shall be interpreted as limiting or affecting EPA's or IL EPA's right of entry or inspection authority under federal law or state law. All parties with access to site Area 9/10 under this paragraph shall comply with all approved health and safety plans.

XIV. PLANS AND REPORTS

A. Respondent shall submit all documents required by the RD SOW, RD WP, and this Consent Order to EPA according to the schedule contained in the SOW, Pre-Design WP and RD WP, and shall submit both a computer disk copy and a hard copy of such documents. EPA shall review all documents specified as requiring approval in the RD SOW, Pre-Design WP, RD WP, or this Consent Order.

B. The preliminary (30%) RD submittal shall not be subject to approval as an individual document but shall have comments regarding its incorporation into the RD submittal. The 95% RD submittal shall be subject to the approval/disapproval procedure set forth in this Consent Order.

C. After review of any report which is required to be submitted for approval pursuant to this Consent Order, EPA shall (1) approve, in whole or in part, the submission; (2) approve the submission upon specified conditions; (3) modify the submission to cure the deficiencies; (4) disapprove, in whole or in part, the submission, directing the Respondent to modify the submission; or (5) any combination of the above.

D. In the event of approval upon conditions, or modification by EPA, pursuant to Paragraph C(2) or (3), Respondent shall within thirty (30) days incorporate the changes or comments, and begin any action required by the comments, as approved or modified by EPA subject only to its right to invoke Dispute Resolution procedures with respect to the modifications or conditions made by EPA. In the event that EPA modifies the submission to cure the deficiencies pursuant to Paragraph C(3), EPA shall notify the Respondent in a cover letter of those modifications that were made to the submittal, and this letter shall be made part of the administrative record for site Area 9/10. Further, in the event that EPA modifies the submission to

cure deficiencies pursuant to Paragraph C(3), EPA retains its right to seek stipulated penalties.

E. Upon receipt of a notice of disapproval pursuant to Paragraph C(4), Respondent shall, within thirty (30) days or such other time as specified by EPA in such notice, correct the deficiencies and resubmit the report for approval, subject only to its right to invoke the Dispute Resolution procedures with respect to the disapproval made by EPA. Any stipulated penalties applicable to the submission shall accrue during the 30-day period or otherwise specified period but shall not be payable unless the resubmission is disapproved or modified.

F. In the event that a resubmitted plan, report or other item, or portion thereof, is disapproved by EPA, EPA may again require the Respondent to correct the deficiencies, in accordance with the preceding Paragraphs. EPA also retains the right to amend or develop the report. Respondent shall implement any such report as amended or developed by EPA, subject only to its right to invoke the Dispute Resolution procedures.

G. If upon resubmission, a report is disapproved or modified by EPA, Respondent shall be deemed to have failed to submit such report timely and adequately unless the Respondent invokes the Dispute Resolution procedures and EPA's action is overturned pursuant to that Section. The provisions of the Dispute Resolution provision and the Stipulated Penalties provision shall govern the implementation of the activities specified in the WP and accrual and payment of any Stipulated Penalties during Dispute Resolution. If EPA's disapproval or modification is upheld, Stipulated Penalties shall accrue for such violation starting from the date on which the resubmission was required.

H. Neither failure of EPA to expressly approve or disapprove of Respondent's document within the specified time period nor the absence of comments shall be construed as approval of the document. In the event of subsequent disapproval of a revised document, EPA retains the right to terminate this Consent Order and perform additional studies or conduct a complete or partial Remedial Design.

I. For any document required to be submitted by the Respondent to the EPA, within forty-five (45) days of receipt of the document, EPA shall provide written notification to Respondent of its approval, approval upon specified conditions, approval with modification to cure deficiencies or disapproval

of the RD Work Plan, or any part thereof. If EPA requires a longer review period, EPA shall notify Respondent within thirty (30) days of receipt of the submitted document.

J. Respondent and EPA shall hold monthly progress report meetings/telephone conferences unless such a meeting is deemed unnecessary by EPA.

K. Respondent shall provide written monthly progress reports to EPA. These monthly progress reports shall include the following information:

(1) A description of the actions which have been taken to comply with this Consent Order during the past month and work planned for the coming month;

(2) All results of validated sampling and tests, including raw data, and all other data received by the Respondent during the month;

(3) Target and actual completion dates of each element of the RD, including project completion, with schedules relating such work to the overall project schedule for RD completion, and an explanation of any schedule deviation or anticipated deviation from the RD Work Plan schedule, and proposed method of mitigating such deviation;

(4) A description of all problems encountered and any anticipated problems during the reporting period, any actual or anticipated delays, and solutions developed and implemented to address any actual or anticipated problems or delays; and,

(5) Changes in key personnel.

L. Respondent shall submit the monthly progress reports to EPA by the fifth day of every month following the effective date of this Consent Order.

XV. PROJECT COORDINATORS

A. On or before the effective date of this Consent Order, EPA and Respondent shall each designate their own Project Coordinator. Each Project Coordinator shall be responsible for overseeing the implementation of this Consent Order. Respondent shall also identify and designate an alternate Project Coordinator. To the maximum extent possible, communications between the Respondent and EPA shall be directed to the Project Coordinators by mail, with copies to such other persons as EPA,

the state, and Respondent may respectively designate. Communications include, but are not limited to, all documents, reports, approvals, and other correspondence submitted under this Consent Order.

B. EPA and the Respondent shall each have the right to change their respective Project Coordinator. The other party must be notified in writing at least 10 days prior to the change.

C. EPA's Project Coordinator shall have the authority lawfully vested in a Remedial Project Manager (RPM) and On-Scene Coordinator (OSC) by the NCP. In addition, EPA's Project Coordinator shall have the authority consistent with the National Contingency Plan, to halt any work required by this Consent Order, and to take any necessary response action when s/he determines that conditions at site Area 9/10 may present an imminent and substantial endangerment to human health or welfare or the environment. If Respondent, or its agents, become aware of any conditions at site Area 9/10 which may present an imminent and substantial endangerment to human health or welfare or the environment, they shall immediately notify the EPA Project Coordinator. The absence of the EPA Project Coordinator from the area under study pursuant to this Consent Order shall not be cause for the stoppage or delay of work.

D. Respondent's Project Coordinator, or his/her designee, shall be on-site during all hours of work and shall be available at all times throughout the pendency of this Consent Order.

XVI. LIABILITY INSURANCE

A. Prior to the commencement of any work under this Consent Order, Respondent shall ensure that the contractor performing work maintains Comprehensive General Liability insurance in the amount of at least one million dollars ($1,000,000.00) per occurrence with an annual aggregate of at least three million dollars ($3,000,000.00). At least seven (7) days prior to the commencement of work under this Consent Order, Respondent shall certify that the contractor has obtained the required insurance. Respondent shall provide EPA with current copies of each insurance policy throughout the duration of the work performed under this Consent Order.

B. The liability insurance limits shall not apply to subcontractors.

XVII. REIMBURSEMENT OF COSTS

A. Within 45 days of the EPA's submission of an itemized cost summary, Respondent shall remit a certified or cashiers check to EPA for all past response costs incurred by the United States at site Area 9/10 together with interest that has accrued thereon at the rate of interest specified for the Hazardous Substances Superfund under CERCLA Section 107(a), in the specified amount of $246,403.79, that have not been waived by effect of the January 1999 Amended Consent Decree between EPA, IL EPA and the City of Rockford, Illinois and various covenant beneficiaries, including Respondent.

B. The check should be made payable to the Hazardous Substances Superfund and should include the name of the overall site, the overall site identification number (05DK), the Regional Lock Box Number account number and the title of this Order. Checks should be forwarded to:

U.S. Environmental Protection Agency
Superfund Accounting
P.O. Box 70753
Chicago, Illinois 60673

C. A copy of the check should be sent simultaneously to the EPA Project Coordinator, Mr. Russ Hart (SR-6J), U.S. EPA, Region 5, Superfund Division, 77 W. Jackson Blvd., Chicago, Illinois 60604.

D. Following the issuance of this Consent Order, EPA shall submit to Respondent on a yearly basis an accounting of all oversight costs, including EPA's itemized cost summary (ICS). Oversight costs may include, but are not limited to, costs incurred by the United States in overseeing Respondent's implementation of the requirements of this Consent Order and activities performed by the government as part of the RD and community relations, including any costs incurred while obtaining access. Costs shall include all direct and indirect costs, including, but not limited to, time and travel costs of EPA personnel and associated indirect costs, contractor costs, cooperative agreement costs, compliance monitoring, including the collection and analysis of split samples, inspection of RD activities, site Area 9/10 visits, discussions regarding disputes that may arise as a result of this Consent Order, review and approval or disapproval of reports, and costs of redoing any of Respondent's tasks. By the date of issuance of this Consent Order, EPA will establish a separate, internal

billing code for the Area 9/10 site oversight activities. The ICS shall serve as basis for payment demands.

Respondent shall, within 30 days of receipt of each accounting, remit a certified or cashier's check for the amount of those costs. EPA's failure to submit a summary within the period specified shall not excuse Respondent's liability for oversight costs.

E. Checks should be made payable to the Hazardous Substances Superfund and should include the name of the overall site, the overall site identification number (05DK), the account number and the title of this Consent Order. Checks should be forwarded to:

U.S. Environmental Protection Agency
Superfund Accounting
P.O. Box 70753
Chicago, Illinois 60673

F. Copies of the transmittal letter and check should be sent simultaneously to the EPA Project Coordinator.

G. Respondent agrees to limit any disputes concerning costs to accounting errors and the inclusion of costs outside the scope of this Consent Order. Respondent shall identify any contested costs and the basis of its objection. All undisputed costs shall be remitted by Respondent in accordance with the schedule set forth above. Disputed costs shall be paid by Respondent into an escrow account while the dispute is pending. Respondent bears the burden of establishing an EPA accounting error or the inclusion of costs inconsistent with the NCP or outside the scope of this Consent Order.

H. For Paragraphs A-G of this Section, interest shall accrue from the date payment of a specified amount is demanded of Respondent in writing. The interest rate is the rate of interest on investments for the Hazardous Substances Superfund in Section 107(a) of CERCLA, 42 USC § 9607(a).

XVIII. INDEMNIFICATION OF THE UNITED STATES

A. Respondent agrees to indemnify and hold the United States Government, its agencies, departments, agents, and employees harmless from any and all claims or causes of action arising from or on account of acts or omissions of Respondent, its employees, agents, servants, receivers, successors, or

assignees, or any persons including, but not limited to, firms, corporations, subsidiaries and contractors, in carrying out activities under this Consent Order.

B. Neither the United States Government, EPA, nor any agency or authorized representative thereof shall be held as a party to any contract entered into by Respondent in carrying out activities under this Consent Order.

XIX. FORCE MAJEURE

A. Respondent shall perform all work, additional work, and work required by modification to this Consent Order, within the time frames set by this Consent Order, unless performance is delayed by a force majeure. "Force majeure", for purposes of this Consent Order, is defined as any event arising from causes entirely beyond the control of the Respondent and of any entity controlled by Respondent, including its contractors and subcontractors, that delays the timely performance of any obligation under this Consent Order notwithstanding Respondent's best efforts to avoid the delay. The requirement that the Respondent exercise "best efforts to avoid the delay" includes using best efforts to anticipate any potential force majeure event and best efforts to address the effects of any potential force majeure event (1) as it is occurring and (2) following the potential force majeure event, such that the delay is minimized to the greatest extent practicable. Examples of events that are not force majeure events include, but are not limited to, increased costs or expenses of any work to be performed under this Consent Order or the financial difficulty of Respondent to perform such work.

B. If any event occurs or has occurred that may delay the performance of any obligation under this Consent Order, whether or not caused by a force majeure event, Respondent shall notify by telephone the Remedial Project Manager or, in his or her absence, the Director of the Superfund Division, EPA Region 5, within 48 hours of when the Respondent knew or should have known that the event might cause a delay. Within five business days thereafter, Respondent shall provide in writing the reasons for the delay; the anticipated duration of the delay; all actions taken or to be taken to prevent or minimize the delay; a schedule for implementation of any measures to be taken to mitigate the effect of the delay; and a statement as to whether, in the opinion of Respondent, such event may cause or contribute to an endangerment to public health, welfare or the environment. Respondent shall exercise best efforts to avoid or minimize any

delay and any effects of a delay. Failure to comply with the above requirements shall preclude Respondent from asserting any claim of force majeure.

C. If EPA agrees that the delay or anticipated delay is attributable to force majeure, the time for performance of the obligations under this Consent Order that are directly affected by the force majeure event shall be extended by agreement of the parties for a period of time not to exceed the actual duration of the delay caused by the force majeure event. An extension of the time for performance of the obligation directly affected by the force majeure event shall not, of itself, extend the time for performance of any subsequent obligation.

D. If EPA does not agree that the delay or anticipated delay has been or will be caused by a force majeure event, or does not agree with Respondent on the length of the extension, the issue shall be subject to the Dispute Resolution procedures set forth in Section XX of this Consent Order. In any such proceeding, to qualify for a force majeure defense, Respondent shall have the burden of demonstrating by a preponderance of the evidence that the delay or anticipated delay has been or will be caused by a force majeure event, that the duration of the delay was or will be warranted under the circumstances, that Respondent did exercise or is exercising due diligence by using its best efforts to avoid and mitigate the effects of the delay, and that Respondent complied with the requirements of paragraph B.

E. Should Respondent carry the burden set forth in paragraph D, the delay at issue shall be deemed not to be a violation of the affected obligation of this Consent Order.

XX. DISPUTE RESOLUTION

A. Any disputes concerning activities or deliverables required under this Consent Order for which Dispute Resolution has been expressly provided for, shall be resolved as follows: If the Respondent objects to any EPA notice of disapproval or requirement made pursuant to this Consent Order, Respondent shall notify EPA's Project Coordinator in writing of its objections within 14 days of receipt of the disapproval notice or requirement. Respondent's written objections shall define the dispute, state the basis of Respondent's objections, and be sent certified mail, return receipt requested. Within 10 days of receipt, EPA shall produce a written response to Respondent's objections setting forth the basis of its position. EPA and the

Respondent then have an additional 5 days to reach agreement. If an agreement is not reached within 5 days, Respondent may request a determination by EPA's Superfund Division Director.

If Respondent requests a determination by the Superfund Division, an administrative record of the dispute shall be maintained by EPA, containing the notice of dispute, the response, and supporting documentation. If EPA concurs with Respondent, then EPA shall so notify Respondent in writing and the parties shall modify this Consent Order (if necessary) pursuant to Section XXX (Modification of Consent Order) to include any necessary extensions of time or variances of work.

The Superfund Division Director's determination is EPA's final decision. Respondent shall proceed in accordance with EPA's final decision regarding the matter in dispute, regardless of whether Respondent agrees with the decision. If the Respondent does not agree to perform or does not actually perform the work in accordance with EPA's final decision, EPA reserves the right in its sole discretion to conduct the work itself, to seek reimbursement from the Respondent, to seek enforcement of the decision, to seek stipulated penalties, and/or to seek any other appropriate relief.

B. Respondent is not relieved of its obligations to perform and conduct activities and submit deliverables on the schedule set forth in the RD WP, while a matter is pending in Dispute Resolution. The invocation of Dispute Resolution does not stay stipulated penalties under this Consent Order.

C. The parties shall use their best efforts to resolve all disputes informally and in good faith. The resolution of any dispute regarding this Consent Order must be in writing and signed by EPA.

D. The party disputing EPA's position shall have the burden of proving that it is arbitrary and capricious or inconsistent with this Consent Order.

XXI. STIPULATED PENALTIES

A. For each day that Respondent fails to complete a deliverable in a timely manner or fails to produce a deliverable of acceptable quality, or otherwise fails to perform in accordance with the requirements of this Consent Order, Respondent shall be liable for stipulated penalties (unless excused under Section XIX-Force Majeure). Penalties begin to

accrue on the day that performance is due or a violation occurs, and extend through the period of correction. Where a revised submission by Respondent is required, stipulated penalties shall continue to accrue until a satisfactory deliverable is produced. EPA will provide written notice for violations that are not based on timeliness; nevertheless, penalties shall accrue from the day a violation commences. Payment shall be due within 60 days of receipt of a demand letter from EPA. Nothing herein shall prevent the simultaneous accrual of separate penalties for separate violations of this Consent Order.

B. Respondent shall pay interest on the unpaid balance, which shall begin to accrue at the end of the 60-day period, at the rate established by the Department of Treasury pursuant to 30 U.S.C. Section 3717. Respondent shall further pay a handling charge of 1 percent, to be assessed at the end of each 31 day period, and a 6 percent per annum penalty charge, to be assessed if the penalty is not paid in full within 90 days after it is due.

C. Respondent shall make all payments by forwarding a check to:

U.S. Environmental Protection Agency
Superfund Accounting
P.O. Box 70753
Chicago, Illinois 60673

Checks should identify the name of the overall site, the overall site identification number (DK), the account number, and the title of this Consent Order. A copy of the check and/or transmittal letter shall be forwarded to the EPA Project Coordinator.

D. For the following major deliverables, stipulated penalties shall accrue:

Deliverable/Activity	Penalty For Days 1-7	Penalty For > 7 Days
Failure to Submit a Draft RD WP or Final RD WP	$1500/Day	$5,000/Day
Failure to Submit a SOW or Pre-Design Schedule Deliverable or any other Section	$1500/Day	$5,000/Day

XIV Submittal

Failure to Submit a Data Report	$250/Day	$1,500/Day
Late Submittal of Progress Reports or Other Miscellaneous Reports/Submittals	$250/Day	$ 1,500/Day
Failure to Meet any Scheduled Deadline	$250/Day	$ 1,000/Day

E. Respondent may dispute EPA's right to the stated amount of penalties by invoking the Dispute Resolution procedures under Section XX herein. Penalties shall accrue but need not be paid during the Dispute Resolution period. If Respondent does not prevail upon resolution, all penalties shall be due to EPA within 30 days of resolution of the dispute. If Respondent prevails upon resolution, no penalties shall be paid.

F. In the event that EPA provides for corrections to be reflected in the next deliverable and does not require resubmission of that deliverable, stipulated penalties for that interim deliverable shall cease to accrue on the date of such decision by EPA.

G. The stipulated penalties provisions do not preclude EPA from pursuing any other remedies or sanctions which are available to EPA because of Respondent's failure to comply with this Consent Order, including but not limited to conduct of all or part of the RD by EPA. Payment of stipulated penalties does not alter Respondent's obligation to complete performance under this Consent Order.

H. If Respondent fails to pay stipulated penalties when due, EPA may institute proceedings to collect the penalties, as well as interest. Respondent shall pay interest on the unpaid balance, which shall begin to accrue on the date of demand at the rate established pursuant to Section 107(a) of CERCLA, 42 USC § 9607(a).

I. Nothing in this Consent Order shall be construed as prohibiting, altering, or in any way limiting the ability of EPA to seek any other remedies or sanctions available by virtue of

Respondent's violation of this Consent Order or of the statutes and regulations upon which it is based, including, but not limited to, penalties pursuant to Section 122(l) of CERCLA, 42 USC § 9622(l), for activities not covered under the Stipulated Penalty provision of this Consent Order.

J. No payments made under this Section shall be tax deductible for Federal or State tax purposes.

XXII. OTHER CLAIMS

A. Respondent waives all claims or demands for compensation under Sections 106, 111 and 112 of CERCLA, 42 USC §§ 9606, 9611 and 9612 against the United States or the Hazardous Substances Superfund established by Section 9507 of Title 26 of the United States Code arising from activity performed pursuant to this Consent Order. This Consent Order does not constitute any decision on preauthorization of funds under Section 111(a)(2) of CERCLA, 42 USC § 9611(a)(2). Respondent further waives all other statutory and common law claims against EPA, including, but not limited to, contribution and counterclaims, relating to or arising out of conduct of the RD.

B. Nothing in this Consent Order shall constitute or be construed as a release from any claim, cause of action or demand in law or equity against any person, firm, partnership, subsidiary or corporation not a signatory to this Consent Order for any liability it may have arising out of or relating in any way to the generation, storage, treatment, handling, transportation, release, or disposal of any hazardous substances, pollutants, or contaminants found at, taken to, or taken from site Area 9/10.

C. Each party to this Consent Order shall bear its own costs and attorneys fees.

XXIII. COVENANT NOT TO SUE

A. In consideration of the actions that will be performed and the payments that will be made by Respondent under the terms of this Consent Order, and except as specifically provided in Section XXIV (Reservation of Rights), Section XVII (Reimbursement of Costs), and Section VIII (Work to be Performed), EPA covenants not to sue Respondent for judicial imposition of costs, damages or civil penalties or to take

administrative action against Respondent pursuant to Sections 106 and 107(a) of CERCLA for performance of the work pursuant to Section VIII. These covenants not to sue shall take effect upon termination of this Consent Order pursuant to Section XXXI (Termination and Satisfaction) and the receipt by EPA of payments required by Section XVII. These covenants not to sue are conditioned upon the complete and satisfactory performance by Respondent of its obligations under the Consent Order. These covenants not to sue extend only to Respondent, its parent company, and successors and assignees thereof, and do not extend to any other person.

B. With regard to claims for contribution against Respondent for matters addressed in this Consent Order, upon having resolved its liability with EPA for the matters expressly covered by this Consent Order, Respondent shall be entitled to protection from contribution actions or claims to the extent provided by Section 113(f)(2) of CERCLA, 42 USC § 9613(f)(2).

XXIV. RESERVATION OF RIGHTS

A. EPA reserves all rights and defenses that it may have individually or collectively pursuant to available legal authority, except as expressly waived in this Consent Order. Further, EPA reserves the right to bring an action against Respondent under Sections 104, 106(a) and 107 of CERCLA for recovery of all response costs including oversight costs, incurred by the United States at site Area 9/10 that are not reimbursed by the Respondent (and not exempted by the January 1999 Amended Consent Decree), and any costs, including but not limited to indirect costs, incurred in the event that EPA performs the RD or any part thereof, and any future costs incurred by the United States in connection with removal, remedial or response activities conducted under CERCLA at site Area 9/10 if Respondent fails to fulfill the terms and conditions of the Consent Order. EPA also reserves all rights outlined in paragraph D of this Section.

B. EPA reserves the right to bring an action against Respondent or any other parties to enforce the past costs and response and oversight cost reimbursement requirements of this Consent Order (except as noted in Section XXIII), to collect stipulated penalties assessed pursuant to Section XXI of this Consent Order, and to seek penalties pursuant to Section 109 of CERCLA, 42 USC Section 9609.

C. Except as expressly provided in this Consent Order,

each party reserves all rights and defenses it may have. Nothing in this Consent Order shall affect EPA's removal authority or EPA's response or enforcement authorities including, but not limited to, the right to seek injunctive relief, stipulated penalties, statutory penalties, and/or punitive damages.

D. Following satisfaction of the requirements of this Consent Order, Respondent shall have resolved its liability to EPA for the work performed by Respondent pursuant to this Consent Order. Respondent is not released from liability, if any, for any response actions taken beyond the scope of this Consent Order regarding removals, other site Areas, remedial action of this site Area 9/10, activities arising pursuant to Section 121(c) of CERCLA, 42 USC § 121(c), and claims for natural resource damages under Section 107 of CERCLA, 42 USC § 9607.

E. EPA recognizes that Respondent may have the right to seek contribution (subject to the exemptions of the January 1999 Amended Consent Decree), indemnity or other remedy against any person not a party to this Consent Order found to be responsible or liable for contributions, indemnity or otherwise for any amounts expended by Respondent in connection with site Area 9/10.

F. Nothing herein constitutes a release or settlement of any claim for personal injury or property damage by any person not a party to this Consent Order against the Respondent.

G. EPA reserves its rights to terminate this Consent Order, perform a complete or partial Remedial Design and seek reimbursement from the Respondent should the Respondent fail to complete the Remedial Design in accordance with this Consent Order.

XXV. ACCESS TO INFORMATION

A. All results of sampling, tests, modeling or other data (including raw data) generated by Respondent, or on Respondent's behalf, during implementation of this Consent Order, shall be made available to and submitted to EPA in the monthly progress reports described in Section XIV of this Consent Order. EPA will make available to Respondent validated data generated by EPA unless it is exempt from disclosure by any federal or state law or regulation.

B. Respondent will verbally notify EPA at least 15 days prior to conducting significant field events (including any sampling, tests and other data generation) as described in the SOW or RD Work Plan. At EPA's verbal or written request, or the request of EPA's oversight assistant, Respondent shall allow split or duplicate samples to be taken by EPA (and its authorized representatives) of any samples collected by the Respondent in implementing this Consent Order. All split samples of Respondent's shall be analyzed by the methods identified in the QAPP.

C. Respondent may assert a claim of business confidentiality covering part or all of the information submitted to EPA pursuant to the terms of this Consent Order under 40 CFR Section 2.203, provided such claim is allowed by Section 104(e)(7) of CERCLA, 42 USC § 9604(e)(7). This claim shall be asserted in the manner described by 40 CFR Section 2.203(b) and substantiated at the time the claim is made. Information determined to be confidential by EPA will be given the protection specified in 40 CFR Part 2. If no such claim accompanies the information when it is submitted to EPA, it may be made available to the public by EPA or the state without further notice to the Respondent. Respondent agrees not to assert confidentiality claims with respect to any data related to site Area 9/10 conditions, sampling, or monitoring.

D. In entering into this Consent Order, Respondent waives any objections to any data gathered, generated, or evaluated by EPA, the state or Respondent in the performance or oversight of the work that has been verified according to the quality assurance/quality control (QA/QC) procedures required by the Consent Order or any EPA-approved WP. If Respondent objects to any other data relating to the RD, Respondent shall submit to EPA a report that identifies and explains its objections, describes the acceptable uses of the data, if any, and identifies any limitations to the use of the data. The report must be submitted to EPA within 15 days of the monthly progress report containing the data.

E. Respondent may assert that certain documents, records and other information are privileged under the attorney-client privilege or the work product doctrine. If Respondent asserts such a privilege, in lieu of providing documents, it shall inform EPA that it is claiming certain documents as privileged and shall, upon request, provide EPA with the following:

1. The title of the document;

2. The date of the document, record, or information;

3. The name and title of the author of the document, record, or information;

4. The name and title of each addressee and recipient;

5. A description of the contents of the document, record, or information; and

6. The privilege asserted by the Respondent.

F. EPA's failure to challenge Respondent's assertion of privilege during the implementation of the RD does not waive EPA's right to challenge the assertion during the implementation of the Remedial Action.

XXVI. RECORD PRESERVATION

Respondent shall preserve all records and documents which relate to implementation of the RD at site Area 9/10 for a minimum of ten (10) years following completion of Remedial Action construction. Respondent shall acquire and retain copies of all documents that relate to site Area 9/10 and are in the possession of its employees, agents, accountants, contractors, or attorneys. After this 10 year period, Respondent shall notify EPA at least 90 days before the documents are scheduled to be destroyed. If EPA requests that the documents be saved, Respondent shall, at no cost to EPA, give EPA the documents or copies of the documents.

XXVII. NOTICES AND SUBMISSIONS

A. Documents, including but not limited to reports, approvals, disapprovals, and other correspondence which must be submitted under this Consent Order, shall be sent by certified mail, return receipt requested, to the following addressees or to any other addressees which the Respondent and EPA designate in writing:

(1) Documents to be submitted to EPA should be sent to:

Russ Hart
Remedial Project Manager
United States Environmental Protection Agency
77 West Jackson Blvd., mail code: SR-6J
Chicago, Illinois 60604-3590
Phone: (312) 886-4844
FAX: (312) 886-4071
E-mail "Hart.Russell@epa.gov"

With copies to:

Tom Williams
Project Manager - Div. of Land Pollution Control
Illinois Environmental Protection Agency
1021 North Grand Avenue East
Springfield, IL 62702
Phone: (217) 557-5250 or (815) 223-1714
FAX: (217) 782-3258 or (815) 223-1344
E-mail "Thomas.Williams@epa.state.IL.US"
or "epa4414@epa.state.IL.US"

Tom Turner
Associate Regional Counsel
U.S. EPA - Region 5
77 West Jackson Boulevard, C-14J
Chicago, Illinois 60604-3590
Phone: (312) 886-6613
FAX: (312) 886-0747
E-mail "Turner.Thomas@epa.gov"

(2) Documents to be submitted to the Respondent should be sent to:

UT/Hamilton Sundstrand
c/o: Scott R. Moyer, PG
Senior Environmental Project Coordinator
United Technologies Corporation
4747 Harrison Avenue
P.O. Box 7002, M/S 323-9
Rockford, Illinois 61125-7002
Phone: (815) 226-6232
FAX: (815) 226-2699
E-mail Scott.Moyer@hs.utc.com

and

UT/Hamilton Sundstrand
Eric Alletzhauser, Esq.
United Technologies Corporation
United Technologies Building
Hartford, Connecticut 06101
Phone: (860) 728-7895
FAX: (860) 660-0301
E-mail eric.alletzhauser@utc.com

XXVIII. EFFECTIVE DATE OF CONSENT ORDER

This Consent Order shall become effective upon the date of signature by the Director of the Superfund Division, EPA, Region 5.

XXIX. COMMUNITY RELATIONS

Respondent shall cooperate with EPA in providing RD information to the public. If requested by EPA, Respondent shall participate in the preparation of all information disseminated to the public pertaining to site Area 9/10.

XXX. MODIFICATION OF CONSENT ORDER

A. In addition to the procedures set forth in Section IX (Additional Work), Section XV (Project Coordinators), Section XIX (Force Majeure), and Section XX (Dispute Resolution), this Consent Order may be amended by mutual agreement of EPA and Respondent. Amendments shall be in writing, shall become effective on the date of EPA execution, and project managers do not have the authority to sign amendments to the Consent Order. Based upon objective and validated findings submitted by Respondent during the Remedial Design, Respondent may propose new Potentially Responsible Parties to EPA for purposes of amending this Consent Order. EPA shall have final determination as to any new Respondents to be added to this Consent Order.

B. No informal advice, guidance, suggestions, or comments by EPA regarding reports, plans, specifications, schedules, and any other writing submitted by the Respondent will be construed as relieving Respondent of its obligation to obtain such formal approval as may be required by this Consent Order. Any deliverables, plans, technical memoranda, reports (other than progress reports), specifications, schedules and attachments required by this Consent Order are, upon approval by EPA,

incorporated into this Consent Order.

XXXI. TERMINATION AND SATISFACTION

A. This Consent Order shall terminate when the Respondent receives written notice from EPA that Respondent has demonstrated in writing and certified to the satisfaction of EPA that all activities (excluding record preservation) required under this Consent Order, including any additional work, payment of past costs, response and oversight costs, and any stipulated penalties demanded by EPA, have been performed and EPA has approved the certification. This notice shall not, however, terminate Respondent's obligation to comply with Sections XVII and XXI of this Consent Order.

B. Respondent's certification shall be signed by a responsible official representing Respondent. The representative shall make the following attestation: "I certify that the information contained in or accompanying this certification is true, accurate, and complete." For purposes of this Consent Order, a responsible official is a corporate official who is in charge of a principal business function.

XXXII. DISCLAIMER

By signing this Consent Order and taking actions under this Consent Order, Respondent does not agree with EPA's Findings of Fact and Conclusions of Law. Furthermore, Respondent's participation in this Consent Order shall not be considered an admission of liability and is not admissible in evidence against the Respondent in any judicial or administrative proceeding other than a proceeding by the United States, including EPA, to enforce this Consent Order or a judgment relating to it. Respondent retains its rights to assert claims against other potentially responsible parties at the site (within the exemptions of the January 1999 Amended Consent Decree). However, Respondent agrees not to contest the validity or terms of this Consent Order, or the procedures underlying or relating to it in any action brought by the United States, including EPA, to enforce its terms.

Administrative Order On Consent - for Remedial Design -
Southeast Rockford Groundwater Superfund Site (Area 9/10)

BY: _____ DATE: 12/13/02
Respondent Title

Michael A Monts
Vice President & General Counsel
Hamilton Sundstrand Corp.

BY: Wm. E. Muno DATE: 1/13/03

William E. Muno, Director
Superfund Division
U.S. Environmental Protection Agency
Region 5

Appendix A

SOUTHEAST ROCKFORD GROUNDWATER CONTAMINATION SUPERFUND SITE, ROCKFORD, ILLINOIS

DECLARATION FOR THE RECORD OF DECISION

SITE LOCATION AND HISTORY

The Southeast Rockford Groundwater Contamination Superfund Site (CERCLIS ID No. ILD981000417) is located in Rockford, Illinois and consists of three Operable Units. Operable Unit One (Drinking Water Operable Unit) provided some residents with a safe source of drinking water by connecting 283 homes to the city water supply. Operable Unit Two (Groundwater Operable Unit) addressed the area-wide groundwater contamination. An additional 264 homes were first connected to the city water supply system. A remedial investigation was then conducted to characterize the nature and extent of the groundwater contamination and to provide information on source areas responsible for contamination. This operable unit identified four areas that were the primary sources of groundwater contamination. These areas were identified as Source Areas 4, 7, 9/10 and 11.

Operable Unit Three (Source Control Operable Unit or SCOU) began as a State-lead action in May 1996 to select remedies for each of the Source Areas. Field investigations included soil borings and soil gas samples at all four areas, surface water and sediment sampling at Area 7 and groundwater monitoring well installation and sampling at area 9/10. Based on the results of these investigations, the Illinois Environmental Protection Agency (Illinois EPA) identified a series of cleanup alternatives and preferred options for the final remedies at the four areas. These alternatives and preferred options were published in a Proposed Plan that was presented to the public in July 2001. This Record of Decision (ROD) contains the actions, alternatives and preferred options of Operable Unit Three that will address contamination in the soil and leachate at Source Areas 4, 7, 9/10 and 11.

STATEMENT OF PURPOSE

This decision document contains the selected remedial actions for the Southeast Rockford Superfund Site, developed in accordance with the Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA), as amended by the Superfund Amendments and Reauthorization Act of 1986 (SARA) and to the extent practicable, the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). This decision is based upon the contents of the administrative record for the Southeast Rockford Superfund Site. The United States Environmental Protection Agency (U.S. EPA), Region V supports the selected remedy on the Southeast Rockford Site.

ASSESSMENT OF THE SITE

The response action selected in the ROD is necessary to protect the public health, public welfare and the environment from actual releases of hazardous substances. Contaminated soils, non-aqueous phase liquid (NAPL), and leachate from Source Areas 4, 7, 9/10, and 11 constitute principal threats of continued contamination to the groundwater, unless remediated. Therefore, technologies in this ROD are designed to remediate the Source Areas and remove these principal threats. The remaining area-wide contamination will be remediated by the natural attenuation of groundwater.

DESCRIPTION OF THE SELECTED REMEDY

The selected remedy is comprised of treatment options for the four Source Areas. Definition of the entire site is the extent of groundwater contamination encompassing an area approximately three miles by two and a half miles that includes residential, light industrial, industrial and municipal properties. Remedy selection was based upon the nature and extent of contamination, as well as consideration of the types of and uses of the properties in each area. The remedies used in this ROD will accomplish the following results: (1) stop on-going contamination of the groundwater, thus protecting the water resources for future generations; (2) ensure that volatile organic compounds (VOCs) in soil gas do not move into the basements of nearby residences; (3) protect people from ingestion of contaminated groundwater; (4) reduce the risk of direct contact with contaminated soil or free product beneath the ground surface; and (5) assure the project is in compliance with the Operable Unit Two ROD provisions that required the controlling of groundwater-contamination sources.

Operable Unit Three will fulfill the requirements to reduce and control potential groundwater risks to the environment and bring all of the site's previously selected remedial actions into compliance with State groundwater protection laws. Operable Unit Three will also address contaminated soils, NAPL (non-aqueous phase liquid) and leachate that are principal threats and the primary causes of groundwater contamination at the four Source Areas.

Source Control Alternatives developed within the Operable Unit Three feasibility study (FS) and discussed within this ROD are separated into soil and leachate alternatives. In some cases, technologies designed to remediate soil, NAPL and leachate contamination are either not sufficient to protect human health and the environment, or they are not practical solutions. In these cases, technologies are considered to contain, rather than treat the resulting groundwater contamination. In order to simplify the ROD, technologies intended to contain contaminated groundwater in the immediate vicinity of the four primary source areas are considered leachate alternatives.

STATUTORY DETERMINATIONS

It is considered the opinion of the Illinois EPA (in consultation with U.S. EPA Region V) that the selected remedy is protective of human health and the environment, attains federal and state requirements that are applicable or relevant and appropriate for this remedial action (or invokes an appropriate waiver), is cost-effective and utilizes permanent solutions and alternative treatment technologies (or resource recovery) to the maximum extent practicable and satisfies the

site at levels that will allow for limited use and restricted exposure, a statutory review will be conducted within five years after initiation of remedial action to ensure that the remedy is, or will be protective of human health and the environment.

ROD DATA CERTIFICATION CHECKLIST

The following information is included in the Decision Summary section of this ROD (additional information can be found in the Administrative Record for the site):

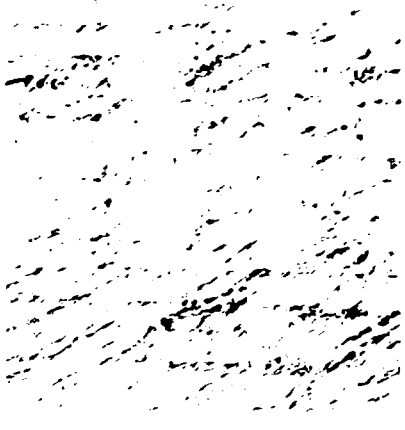
- Chemicals of concern and their respective concentrations.
- Baseline risk represented by the chemicals of concern.
- Cleanup levels established for chemicals of concern and the basis for these levels.
- How source materials constituting principal threats are addressed.
- Anticipated land uses and current and potential future uses of groundwater addressed in the baseline risk assessment and ROD.
- Potential land and groundwater uses that will be available at the site as a result of the selected remedy.
- Estimated capital, annual operation and maintenance (O&M) and total present worth costs, discount rate and the number of years over which the remedy cost estimates are projected.
- Key factor(s) that led to selecting the remedy (how the selected remedy provides the best balance of tradeoffs with respect to the balancing, modifying, criteria key to the decision).

William E. Muno, Director
Superfund Division
U.S. EPA- Region V

6/11/02
Date

Renee Cipriano, Director
Illinois EPA

5/8/02
Date



DECISION SUMMARY
SOUTHEAST ROCKFORD GROUNDWATER CONTAMINATION SUPERFUND SITE, ROCKFORD, ILLINOIS

SITE NAME, LOCATION AND DESCRIPTION

The Southeast Rockford Groundwater Contamination Site is located in the southeast portion of Rockford, Illinois and covers an area approximately three miles long by two and one half miles wide. The contaminant plume in the groundwater with concentrations above 10 parts per billion (ppb) defines the boundaries of the Southeast Rockford Superfund Site, as defined by the Operable Unit Two ROD. The extent of the Southeast Rockford Groundwater Contamination Site is shown in Figure 1.

The area is a predominantly suburban residential area, with scattered industrial, retail and commercial operations throughout. Most of the building structures at this site are one- or two-story residential dwellings, but several industrial areas also exist along Harrison Avenue. There are also a substantial number of commercial and retail operations along Alpine Road, Eleventh Street and Kishwaukee Street. The topography of the site is essentially flat lying, with gradual sloping towards the Rock River. The four major identified source areas of groundwater contamination at the site are identified in the Operable Unit 2 ROD. Figure 1 also illustrates the general locations of the four major source areas. Other groundwater plumes in the area were investigated, but were not determined to be sources of the chlorinated VOCs found in residential wells.

Because of a relative abundance of groundwater resources, the City of Rockford's (the City's) primary source of potable water is groundwater. Geology of the Southeast Rockford Groundwater Contamination Site consists of unconsolidated glacial deposits deposited upon Ordovician Age dolomite and sandstone. A buried bedrock valley over 200 feet in depth cut into the Ordovician bedrock units lies within the site boundaries and contains large unconsolidated sand and gravel deposits. The buried bedrock valley connects with the current position of the Rock River to the west of the site. Together, the unconsolidated glacial deposits and the bedrock units make up two different but hydraulically connected aquifers, both of which are used for potable water supplies. Unconsolidated sands and gravels, as well as the bedrock units contained within the Southeast Rockford Groundwater Contamination Superfund Site meet the requirements pursuant to Title 35 Illinois Administration Code Part 620.210 for Class I Potable Resource Groundwater. The site was proposed for inclusion on the National Priorities List (NPL) on June 24, 1988, and was formally added to the NPL on March 31, 1989 as a state-lead, federally funded Superfund site.

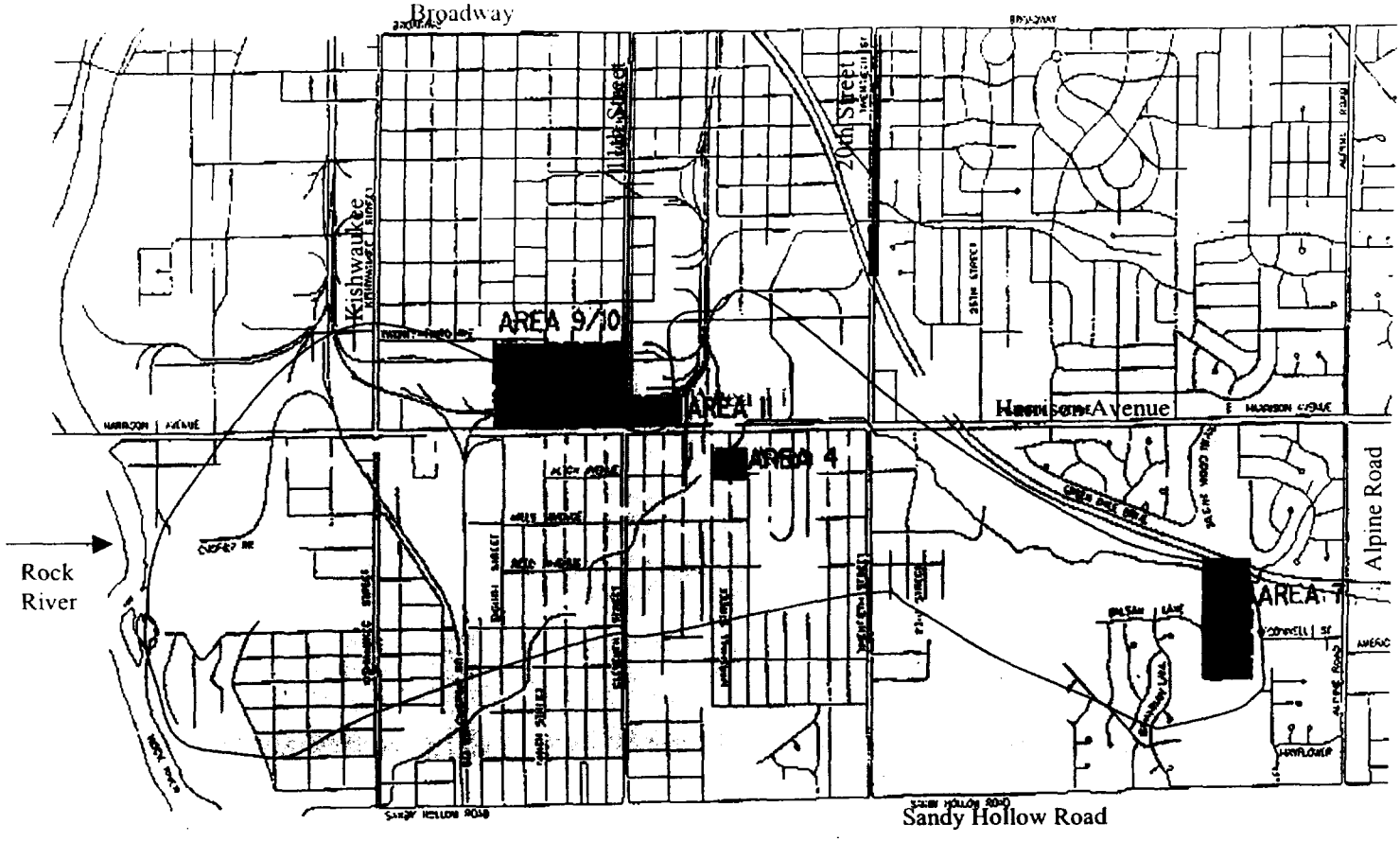


Figure 1. Map of Southeast Rockford Groundwater Contamination

SITE HISTORY

Early groundwater investigations by the State indicated that many private and municipal wells were impacted by chlorinated solvent contamination at levels exceeding federal health standards. Further investigations determined that the solvents were used by industries and were released directly into the environment from units such as storage tanks or from improper disposal practices. These investigations formed the basis of the NPL listing. During 1990, an emergency action by U. S. EPA resulted in 293 homes being connected to the City's municipal water supply system. This action was eligible for U. S. EPA emergency funding, because several residential wells had contaminant levels above removal action levels (RALs). The U.S. EPA determined the extent of the water well hook-ups with support from Illinois EPA.

The next course of action was to address residential wells whose contaminant levels were below RALs, but above federal health standards (Maximum Contaminant Levels or MCLs). Camp Dresser & McKee (CDM), under the direction of Illinois EPA, conducted a residential well-sampling investigation. This investigation became the first of three Operable Units to address site-related contamination. Pursuant to this study and its recommendations, a ROD was signed in June 1991. This ROD required an additional 264 homes to be connected to the City's municipal

water supply and for the construction of a granular activated carbon (GAC) treatment system on one municipal well. The GAC unit was installed as a temporary measure that would be finalized in the second Operable Unit.

Between 1991 and 1994, an inclusive, two-phased remedial investigation (RI) was performed to define the nature and extent of groundwater contamination and to gather preliminary information on the source areas responsible for residential well contamination. These actions culminated in a second ROD signed in September 1995, that essentially required additional hookups to the City's water supply, groundwater monitoring, continued operation of the GAC unit installed in the first ROD and future source control measures at four major source areas of site-related groundwater contamination. Pursuant to a consent decree between the federal government, the state government and the City of Rockford signed in early 1998, the City of Rockford agreed to implement all provisions of the Operable Unit 2 ROD.

SITE ENFORCEMENT ACTIVITIES

Since the development of the 1995 ROD, there have been two major enforcement agreements developed between the U.S.EPA, Illinois EPA and parties associated with the Southeast Rockford site. The first of these was a consent decree entered by the federal district court in Rockford in April 1998. This decree required the City of Rockford to install water mains and services within the public right-of-way, provide needed connections to homes and businesses, supplement the previously existing groundwater well-monitoring network with new wells, and commence a long-term well-network sampling and analytical program. This work has entered the monitoring phase. Over 9200 feet of new water mains have been installed, and an additional 262 individual water service connections have been made. A total of nine new groundwater-monitoring wells were installed, with several of these located near the Rock River. The consent decree also required the payment of up to $200,000 by the City of Rockford to the State of Illinois and federal government, for future oversight costs.

The court entered the second consent decree in January 1999. This decree provided for the reimbursement of approximately $9.1 million dollars for past expenditures by the federal and state agencies that responded to the Southeast Rockford site, as well as a payment of approximately $5 million for a portion of future cleanup costs for Area 7. This innovative feature of the decree anticipates the need to perform remediation at Area 7, because unlike the other soil source areas of concern, it appears that waste materials were brought to Area 7 from other locations. The second consent decree was amended in September 2001 that resulted in the collection of an additional $140,000.

COMMUNITY PARTICIPATION OVERVIEW

In accordance with Section 117, 42 U.S.C. § 9617, of CERCLA, the Illinois EPA and the U.S. EPA held a public comment period from June 11 through August 20, 2001 to allow interested parties to comment on the Feasibility Study and Proposed Plan for the Source Control Operable Unit of the Southeast Rockford Groundwater Contamination Superfund site in Rockford, Illinois. The Illinois EPA presented the Feasibility Study and Proposed Plan at six informational

meetings (two per day) on June 26, June 27 and June 28, 2001 and at a formal hearing held in two sessions on July 19, 2001. The informational meetings were held at the Villa Di Roma restaurant at 11th and Harrison Streets in Rockford and the public hearing was held at the Brooke Road United Methodist Church at 1404 Brooke Road in Rockford.

A Responsiveness Summary is attached to the ROD to document the Illinois EPA's responses to comments received during the public comment period. These comments were considered prior to selection of the final remedy for the four major sources of contamination at the Southeast Rockford Superfund site. The remedy is detailed in Illinois EPA's ROD, with which the U.S. EPA concurs.

BACKGROUND OF COMMUNITY INVOLVEMENT AND CONCERNS

Illinois EPA has been responsible for conducting community relations activities during the investigation for the Drinking Water Operable Unit (Operable Unit One), Phase I and Phase II of the Remedial Investigation and Groundwater Feasibility Study (Operable Unit Two) and the Source Control Remedial Investigation and Feasibility Study (Operable Unit Three).

The site was first brought to the attention of the Illinois EPA by a citizen's complaint that plating waste had been dumped in an abandoned well. Subsequent tests of nearby private wells did not detect plating wastes but did find chlorinated solvents (commonly used in industry for degreasing purposes). A meeting held in 1984 by the Illinois Department of Public Health (IDPH) and the Illinois EPA drew a crowd of approximately 200. Continuing concerns by citizens, however, did not surface until the site was placed on the National Priorities List in 1989 and financial institutions began refusing home mortgages and improvement loans in the area.

During the first operable unit, many citizens resisted the idea of connections to the public water supply, because, in order to receive the hookup, they had to sign an agreement to be annexed into the City of Rockford (if their property became contiguous to city property). That issue is no longer a major concern, since nearly all of the area has now been annexed by the City of Rockford.

The City of Rockford has entered into two consent decrees with the State of Illinois and the United States of America regarding the Southeast Rockford Groundwater Contamination Superfund Site. The original consent decree was entered in federal court in April 1998. That consent decree required the City of Rockford to perform the remedial work required by the September 29, 1995 Groundwater ROD. The ROD included water main extensions and approximately 400 hookups to the City of Rockford's water supply system, groundwater monitoring and continued use of carbon treatment at one of the municipal water supply wells.

SCOPE AND ROLE OF THE RESPONSE ACTION AND OPERABLE UNITS

INTRODUCTION

The Southeast Rockford Groundwater Contamination Site encompasses an area approximately three miles by two and a half miles. The site is primarily defined by the extent of groundwater contamination over 10 ppb of total chlorinated VOCs, as shown in Figure 1. Property within the site boundaries is used for residential, light industrial, industrial and municipal purposes. Remedial actions conducted under Operable Units One and Two addressed the area-wide groundwater contamination, but required additional work at the four source areas. The site characteristics for the four source areas are described in the Section titled, **DESCRIPTION OF SOURCE AREAS.**

OPERABLE UNIT ONE

Because of the size and complexity of the groundwater contamination in the area, the Illinois EPA and U.S. EPA (the Agencies) organized activities at the site into smaller, more manageable groups of activities called Operable Units. The Illinois EPA and its consulting/engineering firm, Camp Dresser & McKee (CDM), began work under Operable Unit One with a remedial investigation. The primary focus of Operable Unit One was to address contamination in residential wells. An additional 117 private wells were sampled as a part of the Operable Unit One Remedial Investigation. The objective of this sampling event was to determine how many homes had wells with levels of VOCs below the time critical removal action cutoff, but above maximum contaminant levels (MCLs). Illinois EPA's sampling revealed that additional residences needed to be connected to the City's water supply system. A proposed plan for Operable Unit One was made public in March 1991. A ROD for Operable Unit One was signed on June 14, 1991. The ROD called for more residences to be connected to the municipal water supply system and for a temporary granular activated carbon (GAC) water treatment unit to be installed at one of Rockford's municipal wells. The municipal well had been closed in 1985 due to unsafe levels of VOCs (CDM, 1990). The GAC unit was installed to assure sufficient potable water capacity for residents added to the City's water distribution system. By November 1991, an additional 264 homes were connected to city water. Between the U.S. EPA's time-critical removal action and Illinois EPA's Operable Unit One, a total of 547 homes received service connections to the City's water supply system. A Remedial Action Report, signed by U.S. EPA on December 21, 1992, certified that the selected remedy for Operable Unit One was operational and functional (Illinois EPA Operable Unit Two ROD).

OPERABLE UNIT TWO

Remedial Investigations for Operable Unit Two began in May 1991 under the direction of the Illinois EPA (CDM, 1992). The objective of the Operable Unit Two remedial investigation was to characterize the nature and extent of groundwater contamination throughout the site and to provide information on "source areas" that were responsible for the contamination (CDM, 1992).

Because of the size and complexity of the site, the remedial investigation was conducted in two phases. Phase I activities expanded the original NPL boundaries into a larger study area within Southeast Rockford, encompassing approximately five square miles (CDM, 1993 1-2). Operable Unit Two, Phase I field activities included the following: 1) a 225-point soil gas survey; 2) the installation and sampling of 33 monitoring wells at 11 locations; and 3) the sampling of 19 Illinois State Water Survey Wells and 16 industrial wells (CDM, 1993 1-2). Fieldwork for Phase I was completed in October of 1991. Based on preliminary data, eight potential sources of groundwater contamination were identified (CDM, 1992).

Operable Unit Two, Phase II field activities were conducted from January 1993 to January 1994. The following activities were conducted during the Phase II investigation: (1) 212 soil gas points were sampled; (2) 44 monitoring wells were installed and 165 groundwater samples were obtained; (3) 55 soil borings were conducted and 126 soil samples were obtained; (4) 24 groundwater samples were obtained from residential wells; (5) 20 residential air samples were taken; and (6) two test pits were excavated in the study area (CDM, 1995 RI 1-1). Although several other groundwater plumes of contamination were identified, the Phase II investigation concluded that there were four primary source areas that were impacting the major plume that constitutes the site. The four primary source areas (Area 4, Area 7, Area 9/10, and Area 11) are identified in Figure 1.

Phase II activities included groundwater modeling that helped to determine future contaminant concentrations within the plume and projected general plume migration directions. The modeling indicated that contaminant levels for 1,1,1-TCA in the plume will remain at levels above its MCL of 200 ppb for 205 years, assuming that the four source areas are remediated. However, if the four source areas are not remediated modeling predicts that over 300 years will be necessary for remediation of the groundwater (CDM, 1995 FS 5-3).

Based on the results of the Remedial Investigation and Feasibility Study (RI/FS) conducted under Operable Unit Two, Illinois EPA issued a Proposed Plan on Operable Unit Two in July of 1995. The ROD for Operable Unit Two was signed on September 29, 1995. The major components of the selected remedy included: municipal water hook-ups for homes and businesses projected to have combined concentrations of 1,1,1-TCA and 1,1-Dichloroethane (1,1-DCA) at levels of 5 ppb or greater; groundwater monitoring for 205 years and future source control measures at the four primary source areas. Although source control was a component of the selected remedy within the Operable Unit Two ROD, the ROD stated that the actual technology to be used for source control measures would be addressed within Operable Unit Three.

OPERABLE UNIT THREE

Field work for the Operable Unit Three remedial investigation began under the direction of Illinois EPA on May 20, 1996. The investigation included: soil gas samples and soil borings at all four areas; surface water and sediment sampling at Area 7 and monitoring well installation and groundwater sampling at Area 9/10. In total, the Operable Unit Three investigation included:

- 68 soil gas samples;
- 13 soil borings with one soil sample per boring in Areas 4, 7, and 11 and two samples per boring in Area 9/10;
- Dye shaker testing for the presence of NAPL;
- 14 surface soil samples;
- Geoprobe groundwater screening at three locations;
- Installation of three monitoring wells; and
- Five groundwater samples (CDM, 2000 RI).

The results of the Operable Unit Three investigations, along with information obtained from previous investigations were used to characterize the four source areas as described within the section of this ROD entitled, **DESCRIPTION OF SOURCE AREAS**. Information obtained during previous investigations was used to generate the Operable Unit Three feasibility study, which in turn, provides the basis for this ROD.

SITE CHARACTERISTICS

INTRODUCTION

This ROD addresses the overall site remedy for the four major source areas that are contributing to the overall groundwater contamination within the Southeast Rockford Superfund Site. The four source areas encompass an area of three miles by two and a half miles, as shown in Figure 1. Groundwater contamination within this area has occurred in the sand and gravel aquifer that is contained within a buried bedrock valley. Generally the contamination follows the bedrock valley and the direction of groundwater flow is east to west, towards the Rock River. The problems within the Southeast Rockford Groundwater Contamination Superfund Site are complex and interrelated. As a result, The Illinois EPA has divided the remediation efforts into four source areas. Each Source Area is described in the following paragraphs.

AREA 4

Source Area 4 is situated in a mixed industrial, commercial and residential area located east of Marshall Street and south of Harrison Avenue. Area 4 is comprised of the former machine shop (Swebco Manufacturing, Inc.) located at 2630 Marshall Street and a residential trailer park (Barrett's) located on the northeast portion of Area 4. According to previous site investigation results, elevated concentrations of dichloroethane (TCA) were detected in soil at a depth of eight feet below ground surface (bgs) in the former machine shop loading dock and parking lot areas. Also, elevated concentrations of chlorinated VOCs were detected in several down-gradient groundwater monitoring wells. These groundwater results indicate that Area 4 is impacting the site-wide groundwater. No elevated concentrations of chlorinated VOCs were detected in the trailer park area.

AREA 7

Source Area 7 is primarily an open grassy area located at the east terminus of Balsam Lane. Area 7 encompasses a city park (Ekberg Park) and an open area containing wooded areas. Ekberg Park consists of a basketball court, tennis court, and a playground. The open field and wooded areas exist south of the park on a hillside that slopes to the north. Two small valleys merge at the base of the hill, allowing surface water to drain northward into an unnamed creek. Private residences border Area 7 on the east and southeast.

Part of Area 7's past history includes a gravel pit as shown on the Rockford South Quadrangle map (USGS 1976). Examination of aerial photographs since the 1950s indicates that various activities have occurred at this location. In particular, a 1970 aerial photo shows areas of excavation and disturbed ground in two large areas centered at about 600 and 1,300 feet east of the east end of Balsam Lane. A third suspect area is located along the small tributary valleys passing from southeast to northeast of Balsam Lane. In these valleys, debris and areas void of vegetation are visible on 1958, 1964 and 1970 aerial photos. In addition, the Illinois EPA and the U.S. EPA have received several past reports of illegal dumping in Area 7.

Based on previous site investigation results, elevated concentrations of ethylbenzene, toluene, xylene (ETX) and chlorinated VOCs were detected in soil in the northern portion of Area 7. The vertical extent of soil contamination extends to a depth of 27 to 29 feet. Chlorinated VOCs were also detected in shallow groundwater and surface water in the unnamed creek. The groundwater results indicate that Source Area 7 is impacting the site-wide groundwater.

AREA 11

Area 11 is located north of Harrison Avenue and east of 11th street. Historically, manufacturing activities in Area 11 included the production of paint and various varnish products for the furniture industry, as well as gears and rollers for newspaper presses. Presently, a restaurant, a machinery painting facility and a wood products supplier are active in Area 11.

The Area 11 groundwater contaminant plume consists primarily of aromatics (xylene, toluene and ethylbenzene), although elevated concentrations (up to 2,900 ppb) of several chlorinated VOCs are also present. Results from the Phase II remedial investigation (CDM 1995) indicate the presence of a NAPL within Area 11. A NAPL is a liquid usually comprised of hydrocarbons such as fuels or solvents that do not mix with groundwater in the aquifer. The NAPL within Area 11 is a light NAPL, as indicated by its presence near the top of the water table. The thickness of the NAPL in Area 11 is generally five to ten feet, but at some points, may approach 25 feet.

AREA 9/10

Area 9/10 is an industrial area that is bounded by 11th Street on the east, 23rd Avenue on the north, Harrison Avenue on the south and 6th Street on the west. This part of the study area has a long history of industrial activity that extends as far back as 1926. At that time, the Rockford Milling Machine and Rockford Tool companies merged to become the Sundstrand Machine Tool Company which is located at the northwest corner of 11th Street and Harrison Avenue (Lundin 1989). Industries in the area include Sundstrand Corporation's Plant #1, the former Mid-States Industrial facility, Nylint Corporation warehouse (formerly occupied by General Electric), Paoli Manufacturing, Rockford Products Corporation, Rohrbacher Manufacturing, and J. L. Clark.

According to previous investigations, an outdoor drum storage area associated with the former Sundstrand Plant #2 was located at the southwest corner of the Sundstrand parking lot (9th Street and 23rd Avenue). From 1962 to 1985, various 55-gallon drums of VOC-bearing materials including tetrachloroethene (PCE), TCA, toluene, acetone and methylene chloride were stored in this area. In addition, from 1962 through 1987, the dock area at Sundstrand Plant #1 housed approximately 14 underground storage tanks (USTs). These USTs were constructed of steel and contained solvents, cutting oils, fuel oil and jet fuel (JP4). The solvents included PCE, TCA and solvents that were used for parts cleaning.

DESCRIPTION OF SOURCE AREAS

SOURCE AREA 4

Source Area 4 is bounded by Harrison Avenue to the north, Alton Avenue to the south, and Marshall Street to the west (see Figure 2). Barrett's Mobile Home Park is located just east of the

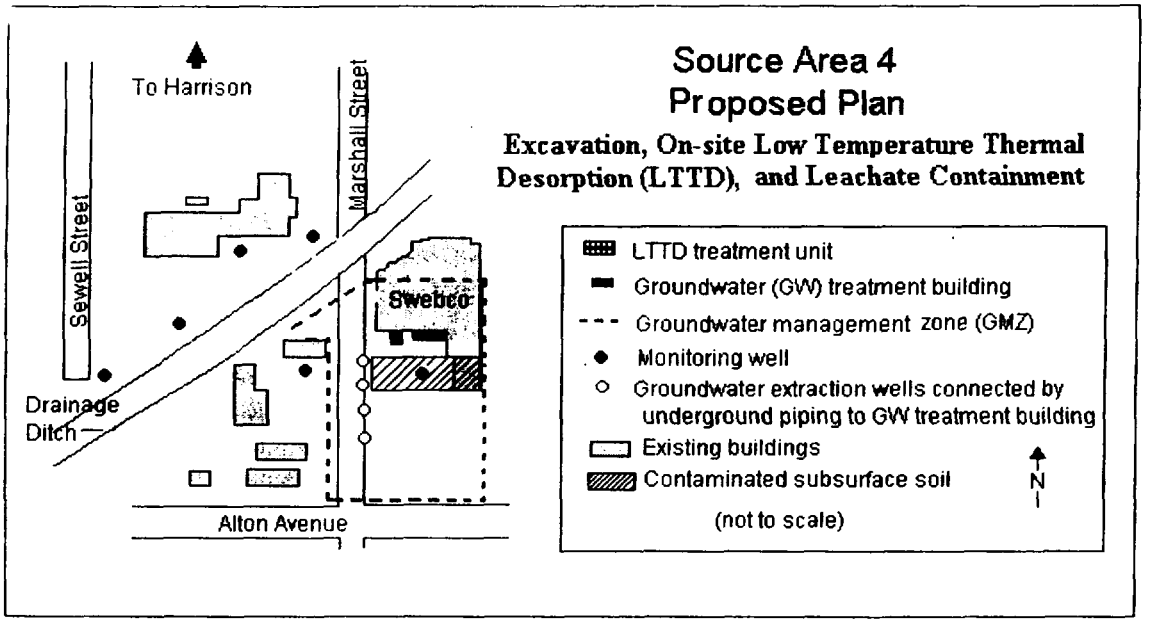


Figure 2. Source Area 4 Map

area. The source of contamination is believed to be leaking underground storage tanks beneath the parking lot of Swebco Manufacturing, Inc., located at 2630 Marshall Street (CDM, 1993 2-14). Swebco was a precision machining shop that produced metal parts. The property is approximately one acre in size and is currently zoned light industrial. The properties surrounding Area 4 are currently zoned either residential or light industrial and include small businesses and single-family homes. Officials with the City of Rockford Planning Division indicate the future plans for Area 4 and surrounding properties are consistent with current uses (Dust).

Illinois EPA Bureau of Land files indicate that Swebco Manufacturing, Inc. used three underground storage tanks. The underground storage tanks are located beneath the parking lot at the facility and available information indicates they are likely to be empty (CDM, 2000 RI 1-5). The contents of the tanks have been reported to be fuel oil and waste oil (CDM, 2000 RI 1-5). It is suspected that the waste oil may have contained 1,1,1-TCA, which is a noncarcinogen.

Soil borings performed within Area 4 to depths of approximately 30 feet bgs indicate the subsurface is largely comprised of medium grain sand (CDM, 1995 Appendix A). The borings also indicate that the sand is overlain with approximately five feet of silty topsoil in most areas. Groundwater is encountered at approximately 29 feet bgs (CDM, 2000 RI 3-1). Groundwater in

the unconsolidated sediments beneath Area 4 flows in a west-northwest direction (CDM, 1995 RI 4-41).

During Phase II of the Operable Unit Two remedial investigation (December 1992), high concentrations of 1,1,1-TCA were found in soils beneath a parking lot at the Swebco facility (CDM, 1995 RI 4-37,4-41). Further investigation identified soil contamination at concentrations up to 510 parts per million (ppm) and appears to extend to a depth of 35 feet (CDM, 2000 RI 3-1). The extent of contaminated soils is an area approximately 50 by 75 feet, with the long axis oriented east-west (CDM, 2000 RI 3-1). Assuming a thickness of eight feet and an average 1,1,1-TCA soil concentration of 275 ppm, the volume of highly contaminated soil was estimated at 1,100 cubic yards, with a weight of 1,1,1-TCA at 977 pounds (CDM, 2000 RI 4-41). As 1,1,1-TCA from the contaminated soils are water soluble, contaminants from Area 4 are highly mobile in groundwater, as evidenced by high levels of 1,1,1-TCA (1 ppm) in down-gradient wells (CDM, 1995 RI 4-99). The cause of contamination is believed to be a single source which consists mostly of 1,1,1 TCA (CDM, 2000 RI 3-1). Table 1 shows the maximum concentrations of the contaminants of concern at Area 4.

Soil Gas and Indoor Air

Soil gas (air in the void spaces within soil) concentrations of 1,1,1-TCA at Area 4 range from below detection limits to 7.2 ppm (CDM, 2000 RI 3-3). Residential air sampling identified 1,1,1-TCA, TCE, PCE, 1,1-DCA, and 1,1-Dichloroethylene (1,1-DCE) in the indoor air of homes within the area (CDM, 1995 RI 4-83). The 1995 RI Report concluded that the results could not be directly correlated with groundwater contamination. The report also concluded that concentrations for all compounds were below health-based air guidelines available in 1995 (CDM, 1995 RI 4-85, 90). Because the majority of the indoor air samples with significant detections were those taken from sump pits in basements of homes in Area 4, IDPH recommended that the pits be filled to limit potential exposure. Contact with the owners of homes with sump pits indicated that many had taken the advice of IDPH and filled the pits.

U.S. EPA has recently begun to consider new air screening values. After reevaluating the indoor air data from homes near Area 4, U.S. EPA and Illinois EPA have decided to conduct additional air sampling in the homes to ensure that concentrations are below levels of concern. Illinois EPA plans to conduct the sampling and analysis during the remedial design phase, but actual fieldwork may not begin until sometime in 2002.

As part of the Five Year Review obligation to ensure that a remedy remains protective of health and the environment, Illinois EPA and U.S. EPA will continue to evaluate new developments in this field. When conducting future indoor air sampling, the Agencies will determine if homeowner activities or hobbies might have influenced sampling results. After accounting for such factors, the Agencies would consider a variety of possible responses such as checking soil gas pathways between the site and residence; determining whether additional measures should be taken to increase the capture zone of the area soil remedy and whether it may be appropriate to install air purifying canisters in the homes.

Table 1. Contaminants of Concern at Source Area 4

Contaminant[1]	SOIL (ppm)			GROUNDWATER (ppb)	
	Concentration Range in Soil		Remediation Goal	Concentration	MCL
	Above 10 feet	Below 10 feet			
Volatile Organics					
1,1-Dichloroethene	BDL	BDL	0.06 [2]	BDL-**10J**	7
1,1,1-Trichloroethane	BDL-0.11	BDL-**510.0**	9.118 [3]	BDL-**1,000**	200
Trichloroethene	BDL-0.025	BDL	0.06 [2]	BDL-**28**	5
Semivolatile					
Benzo (a) anthracene	BDL-**5.6**	BDL	0.9 [2]	NA	NA
Benzo(b)fluoranthene	0.06-**11**	BDL	1.38 [6]	NA	NA
Benzo(k)fluoranthene	0.07-**11**	BDL	1.85 [6]	NA	NA
Benzo(a)pyrene	BDL-**1.1**	BDL	0.23 [6]	NA	NA
Dibenzo(a,h)anthracene	BDL- **0.43**	BDL	0.09 [2]	NA	NA
Metals					
Beryllium	0.2-0.7	NA	1.51 [7]	NA	NA

Notes:

ppm - Parts per million or milligrams per kilogram

ppb - Parts per billion or micrograms per liter

MCL- Maximum Contaminant Level developed pursuant to Safe Drinking Water Act

BDL- Below detection limit of laboratory instruments or methods

NA - Compound was not analyzed or measured in laboratory

J - Value is estimated based on laboratory results

1 Only compounds that exceed Tier 1 screening level in soil or an MCL in groundwater are included in Table. Compounds in **bold** text are contaminants of concern for soil, and associated *remediation objectives shall be attained through remediation. Remediation objectives shown for* all other compounds are only for informational purposes. See section entitled "Remedial Action Objectives" for details.

2 Remediation Goal is the Tier 1 residential screening level for soil for direct contact.

3 Remediation Goal Calculated using equation R15 of TACO that takes attenuation into account.

4 Only Tier 1 residential screening levels for soil for direct contact are considered for semivolatiles because semivolatiles are not currently groundwater contaminants and are not expected to become groundwater contaminants.

5 Compound will be evaluated further through sampling during *remedial design*. Although compound exceeds Tier 1 residential screening level for soil for direct contact, it is not considered a chemical of concern at this time because semivolatiles' are prevalent in environment and not found in groundwater.

6 95% Upper Confidence Limit on background concentrations

7 Upper Tolerance Limit on site-specific beryllium background concentrations.

Surface Soils

Surface soil samples from Area 4 identified several VOCs including 1,1,1-TCA at concentrations up to 0.1 ppm (CDM, 1995 RI 4-34). Polynuclear Aromatic Hydrocarbons (PNAs), and compounds associated with pesticides and polychlorinated biphenyls (PCBs) were also identified in Area 4 soils. Concentrations of PCBs and pesticides found in Area 4 surface soils do not pose a threat to human health. Concentrations of individual PNAs ranged from non-detection (ND) to 16 ppm (CDM, 2000 RI Table 3-1). Concentrations of PCBs and pesticides ranged from ND to 0.100 ppm (CDM, 1995 RI 4-34) and ND to 0.026 ppm (CDM, 2000 RI Table 3-1).

Sub-Surface Soils

Sub-surface soil samples from approximately three to ten feet bgs surface at Area 4 showed higher concentrations of VOCs, PNAs and pesticides. Elevated concentrations of VOCs and PNAs were found primarily in two soil borings (SB4-1 and SB4-5) taken beneath the parking lot at the facility. Elevated concentrations in both borings were found around 30 feet bgs with individual VOCs (1,1,1-TCA) up to 510 ppm (CDM, 2000 RI 3-14) and PNAs, such as naphthalene, up to 3 ppm (CDM, 1995 RI 4-40). The highest concentration of an individual pesticide compound in the subsurface was 0.005 ppm (CDM, 1995 RI 4-40). Inorganic compounds were detected in Area 4 at levels below background.

Groundwater

Significant groundwater contamination exists beneath and down gradient of Area 4. Elevated levels of 1,1,1-TCA and TCE were identified in wells down gradient of the facility at concentrations of 1.0 ppm and 0.02 ppm, respectively. The potential pathways of contaminant migration include groundwater and void spaces in soils (e.g. soil gas). Soil gas concentrations of 1,1,1-TCA in the immediate vicinity of Area 4 range from below detection limits to 7.2 ppm (CDM, 2000 RI 3-3). Surface migration of contaminants is not likely, given that most of Area 4 is paved.

Non-Aqueous Phase Liquid (NAPL)

Soil boring SB4-202 taken in the northern part of Swebco's parking lot tested positive for the presence of a light non-aqueous phase liquid (LNAPL) directly above and within the top portion of the saturated zone. SB4-204 is believed to be right at the source of the area's contamination and contained 510 ppm of 1,1,1-TCA. LNAPL was found present at the source from 27 to 35 feet bgs and was not found in deeper portions of SB4-202 (CDM, 2000 RI 3-14). Soil boring SB4-202 encountered a low permeability clay layer from approximately 62 feet bgs through 65 feet bgs, where the boring was terminated. In most cases, compounds found at Area 4 are considered to be Dense Non-Aqueous Phase Liquids (DNAPLs). The physical and chemical properties of DNAPL compounds cause them to sink through the groundwater until geologic material with a low permeability (such as clay) is encountered. However, DNAPLs do not always present themselves as a phase separate from water and the presence of other less dense solvents may change the DNAPL compound's behavior in the subsurface (U.S. EPA, Groundwater). Visual examination and headspace analysis on soil samples obtained directly above the clay layer did not exhibit DNAPL presence (CDM, 2000 RI App. B).

SOURCE AREA 7

Source Area 7 is located in the most southeastern portion of the Southeast Rockford Superfund Site, northwest of the intersection of Alpine and Sandy Hollow Road. Specifically, Area 7 is located at the eastern end of Balsam Lane (see Figure 3). The area contains Ekberg Park, a

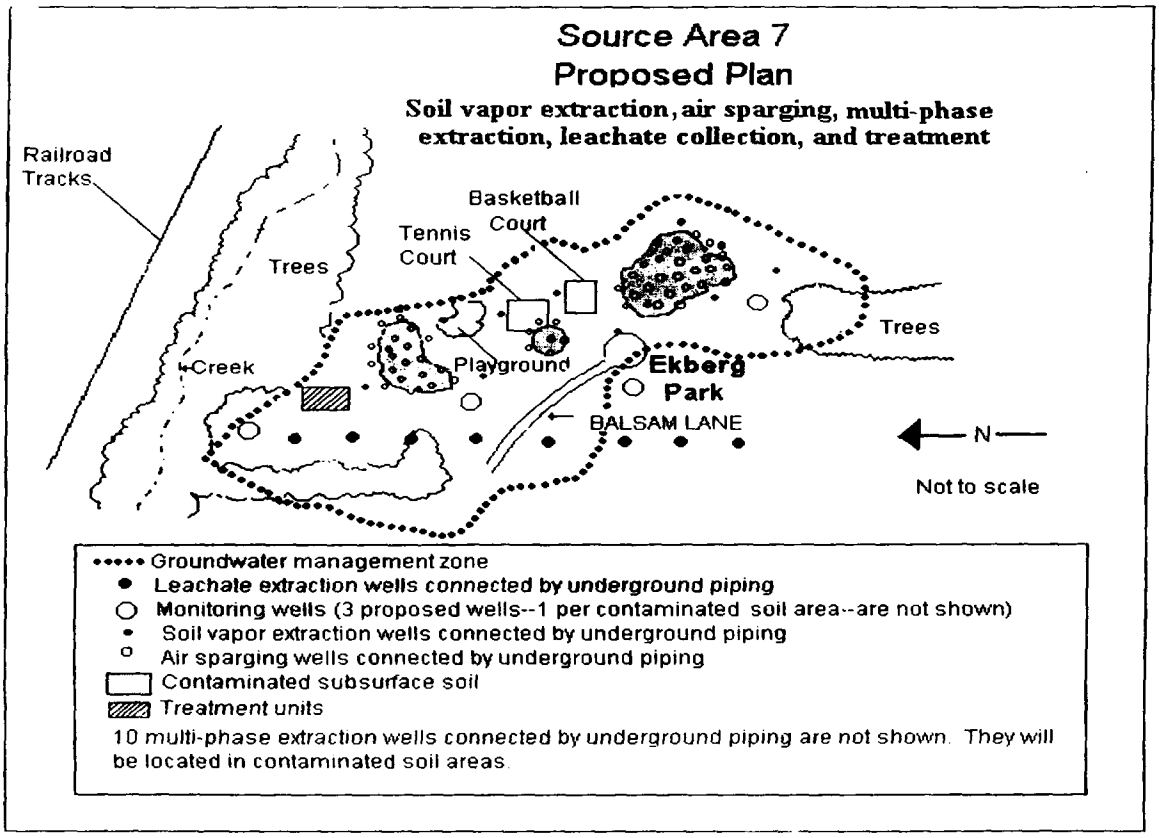


Figure 3. Source Area 7 Map

municipal park owned and maintained by the Rockford Park District. The park consists of open grassland, paved tennis and basketball courts, a children's playground, and a parking area. The park is zoned residential and the City's future plans are consistent with current use (Dust). Area 7 also includes privately owned agricultural land and wooded areas to the south and north of the park (Dust). Surface water drainage at Area 7 follows the area's topography that slopes downward from south to north. Two small valleys merge at the base of the hillside on the south of the area and feed into an unnamed creek that borders the north side of the site. Residential areas border the area to the east and west.

Elevated concentrations of VOCs in monitoring well number 106 (MW106) and aerial photographs showing ground surface excavations helped to identify Area 7 as an area of concern (CDM, 1995 RI 4-12). Part of Area 7 was once a gravel pit, as shown on historical maps compiled by the United States Geological Survey. Examination of aerial photographs since the

1950s identifies areas of excavation and disturbed ground east of the end of Balsam Lane. In addition, U.S. EPA has received reports of illegal dumping in the area in the past (CDM, 2000 RI 1-5).

The geology at Area 7 consists of a heterogeneous combination of sands, silts, and clays that overlay dolomite bedrock. The heterogeneous nature of the geology at Area 7 correlates well with reports of past activities such as quarrying and land filling. Groundwater in both the upper unconsolidated and bedrock aquifer travels in a northwest direction. Depth to groundwater ranges from 36 feet at MW135 located south of the park, to 13 feet in MW134 within the park, to less than two feet in MW105 near the creek (CDM, 1995 RI Table 3-3).

Soil Gas and Indoor Air

Soil gas surveys completed in May 1992 and February 1993 identified 1,1,1-TCA, PCE and TCE at levels ranging up to 3.8 ppm, 1.1 ppm and 0.690 ppm respectively (CDM, 1995 RI 4-14, and 17). The highest concentration for the sum of 1,1,1-TCA, PCE and TCE concentrations in soil gas was 5.59 ppm obtained south of the basketball courts (CDM, 1995 RI 4-15). Soil gas data obtained in 1996 identified concentrations for the sum of 1,1,1-TCA, PCE and TCE ranging up to 460 ppm in areas north of the children's playground; however, the 1996 data were generated using different procedures than those used in 1992 and 1993.

Residential air sampling in the vicinity of Area 7 identified levels of 1,1,1-TCA, TCE and PCE, at levels less than those found in homes near Area 4. As with Area 4, results could not be directly correlated with groundwater contamination. Concentrations for most compounds were below that of indoor air studies conducted in other cities and all were below health-based air guidelines in place in 1995 (CDM, 1995 RI 4-85, 90).

U.S. EPA has recently begun to consider new air screening values. After reevaluating the indoor air data from homes near Area 4, U.S. EPA and Illinois EPA have decided to conduct additional air sampling in the homes to ensure that concentrations are below levels of concern. Illinois EPA plans to conduct the sampling and analysis during the remedial design phase, but actual fieldwork may not begin until sometime in 2002.

Test Pits

Three test pits were excavated in Area 7 in June 1993. The test pits revealed metal cans, other metal objects, glass bottles and miscellaneous trash. Soil samples taken from the test pits identified PCE ranging up to 22 ppm, 1,1,1-TCA up to 4 ppm, and TCE up to 3 ppm (CDM, 1995 RI 4-25). Table 2 identifies concentrations of contaminants of concern found in Area 7 soils and groundwater. Soil samples from each test pit were also analyzed for Toxicity Characteristic Leaching Procedure (TCLP) contaminants. Concentrations in the TCLP soil sample from test pit 2 exceeded the TCLP regulatory level for TCE and PCE at concentrations of 1.1 ppm and 0.7 ppm, respectively (CDM, 1995 RI 4-26).

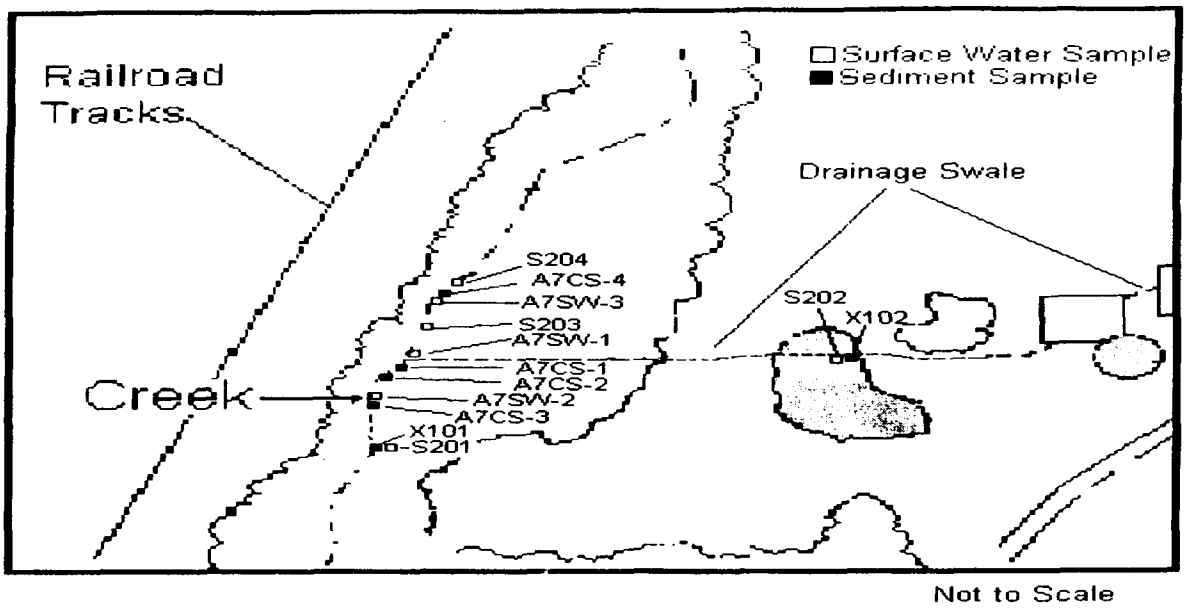


Figure 4. Source Area 7 Hot Spots

Surface Soils

Surface soil samples identified the presence of VOCs, PNAs, metals, and pesticides in surface soils. Surface soil concentrations of VOCs, which are the contaminants of primary concern, ranged up to 0.22 ppm of 1,2-Dichloroethylene (1,2-DCE), 0.04 ppm of 1,1,1 -TCA, 0.14 ppm of TCE, and 0.4 ppm of PCE (CDM, 1995 RI 4-32). One SVOC, bis(2-ethylhexyl)phthalate was detected in all surface samples and could be either due to laboratory contamination or plastics disposed of at the site (CDM, 1995 RI 4-32). With the exception of bis(2-ethylhexyl)phthalate, only two surface soil samples contained concentrations of PNAs, most notably benzo(a)pyrene at levels up to 0.17 ppm. All semi-volatile concentrations were below site-background. Metals concentrations in surface soils at Area 7 were compared to site-specific background concentrations for beryllium and thallium. Pesticide concentrations in surface soils are likely due to the agricultural activities in the area (CDM, 1995 RI 4-32).

Sub-Surface Soils

Twenty-four soil borings were conducted at Area 7 in order to characterize the nature and extent of contamination bgs in areas that were identified by soil gas and surface soil analysis (CDM, 1995 RI 4-43). The VOCs most often identified were TCA, PCE and xylene. The VOC 1,1,1-TCA was found at concentrations of 360 ppm from depths of 4 to 6 feet in sample SB7-24A, and 380 ppm from depths of 15 to17 feet in sample SB7-8D (CDM, 1995 RI 4-43). PCE was identified at levels ranging up to 260 ppm in sample SB7-8D. Xylene was identified at concentrations ranging up to 210 ppm in SB7-10A (CDM, 1995 RI 4-43).

Subsurface sampling results from past investigations identify three primary VOC source areas (hot spots) at Area 7. Figure 4 identifies the three hot spots located at Area 7. Notable concentrations of total VOCs in the hot spot located at the southern portion of Area 7 (the

southern hot spot) at the confluence of the surface water drainage ditches, extends from approximately 4 to 28 feet bgs. Significant concentrations of total VOCs in this area include: 441 ppm in SB7-14 at 4 feet bgs; 1,019 ppm in SB7-8 at 15 feet bgs; and 357 ppm in SB7-9 at 20 feet bgs (CDM, 1992 RI Figure 4-19). Notable concentrations of total VOCs in the hot spot located just west of the tennis courts (the central hot spot) extend from approximately 19 to 23 feet bgs. Concentrations of total VOCs in the central hot spot include 35 ppm in SB7-4 at 20 feet bgs (CDM, 1995 RI Figure 4-19). Lastly, significant concentrations of total VOCs were identified in the northern portion of Area 7, north and west of the playground area (the northern hot spot). Total VOC concentrations in the northern hot spot include: 627 ppm in SB-24 at 4 feet bgs; 17 ppm in SB7-202 at 11 feet bgs; and 875 ppm in SB7-201 at 25 feet bgs (CDM, 1995 RI Figure 4-19). Significant contamination in the northern hot spot ranges from 3 to at least 28 feet bgs. The depth to which contamination extends in this area was not determined (the soil boring was terminated upon encountering a clay layer rather than risk spreading contamination deeper) (CDM, 1995 RI 3-20).

NAPL

Subsurface sampling results for VOCs that were obtained during the Operable Unit Two remedial investigation suggest the presence of NAPL in the northern and southern hot spots in Area 7. Specific tests designed to positively identify NAPL were not performed on soils in the southern hot spot. The investigation of this hot spot was conducted largely during the Operable Unit Two remedial investigation and work plans did not provide for specific tests for NAPL presence. However, PCE concentrations found in soil sample SB7-8D taken from soil boring SB7-8 suggest the presence of a NAPL (CDM, 1995 RI 4-48). The boring log also indicates an elevated headspace and a strong solvent odor for sample SB7-8D (CDM, 1995 RI Appendix A). Based on density, PCE detected within this sample would be expected to be present as a DNAPL. DNAPLs are also known as sinkers because if they are present at high concentrations they will sink in groundwater rather than float on top of the water table. However, VOCs that are less dense than PCE, such as xylene, naphthalene and 2-methyl naphthalene were also identified within soil boring SB7-8 at concentrations high enough to exist as NAPL (CDM, 1995 RI 4-48). At higher concentrations, these compounds would usually present themselves as an LNAPL and would float on or near the top of the water table, rather than sink. Headspace analyses noted in the boring log for SB7-8 shows the highest readings (130 ppm) at 15 feet bgs, just below the approximate depth at which the water table was encountered (CDM, 1995 RI Appendix A). Headspace analysis drops to 60 ppm at 25 feet bgs, and 11 ppm at 45 feet bgs where the boring was terminated. The decrease in headspace analysis, with depth away from the water table indicates that if a NAPL were present in this hot spot, it would likely present itself as an LNAPL. The decrease in headspace analysis with depth also helps to discount the presence of a DNAPL at this area, although it cannot be ruled out.

Table 2. Area 7 Contaminant Concentration Ranges and Preliminary Remediation Goals

Contaminant[1]	SOIL (ppm)					GROUNDWATER (ppb)	
	Concentration Range in Soil		Remediation Goals[2]			Concentration	MCL
	Above 10 feet	Below 10 feet	Proximal	Distal	Area-wide		
Volatile Organics							
Benzene [3]	BDL	BDL-0.22	0.03 [4]	0.03 [4]	0.8		
Chloroform [3]	BDL	BDL-0.57	0.0006 [4]	0.0006 [4]	0.3	BDL-23	
Chlorobenzene [3]	BDL	BDL-1.6	1.0 [4]	1.0 [4]	130		
1,1-Dichloroethene	BDL-0.003	BDL-**1.3**	0.06 [4]	0.06 [4]	700	BDL-**180J**	7
1,2-Dichloroethane	BDL-0.008	BDL-0.18	0.02 [4]	0.02 [4]	0.4	BDL-**13**	5
1,2-Dichloroethene(total)	BDL-**49.0**	BDL-**47.0**	0.941 [5,6]	11.582 [5,6]	1200	BDL-**5,900**	170 [6]
Ethylbenzene	BDL-26.0	BDL-31.0	57.347 [5]	144 [7]	400	BDL-**31,000**	700
Methylene Chloride	BDL-0.03	BDL-0.01	1695 [7]	1695 [7]	13		
Tetrachloroethene	BDL-**110.0**	BDL-**260.0**	1.465 [5]	94 [7]	11	BDL-**1, 200**	5
Toluene	BDL-23.0	BDL-23.0	255 [7]	255 [7]	650	BDL- 170	1,000
1,1,1-Trichloroethane	BDL-**360.0**	BDL-**460.0**	108.033 [5]	499 [7]	1200	BDL-**8,000**	200
1,1,2-Trichloroethane	BDL-0.004	BDL-0.46	0.619 [5]	56.315 [5]	1800	BDL	5
Trichloroethene	BDL-**24.0**	BDL-**130.0**	0.310 [5]	7.220 [5]	5	BDL-**650**	5
Vinyl Chloride	BDL	BDL	0.01 [4]	0.01 [4]	0.03	BDL-**75**	2
Xylenes (total)	BDL-**210.0**	BDL-**190.0**	119 [7]	119 [7]	410	BDL -1,100	10,000
Semivolatile Organics							
2,4-Dinitrotoluene [8]	BDL- 1.50	BDL	0.162 [5]	80.9 [5]	0.9	NA	NA
Metals							
Beryllium	0.13-0.66	NA	NC	NC	1.51 [9]	NA	NA
Pesticides							
Dieldrin [8]	BDL-0.036	BDL-0.002	NC	NC	0.004 [4]	NA	NA

Notes:

ppm - Parts per million or milligrams per kilogram

ppb - Parts per billion or micrograms per liter

MCL- Maximum Contaminant Level developed pursuant to Safe Drinking Water Act

J - Value is estimated based on laboratory results

BDL- Below detection limit of laboratory instruments or methods

NA- Compound was not analyzed or measured in laboratory

NC- Remediation objective not calculated

1 Only compounds that exceed Tier 1 screening level in soil or an MCL in groundwater are included in Table. Compounds in **bold** text are contaminants of concern for soil and associated remediation goals shall be attained through remediation. Remediation objectives shown for all other compounds are only for informational purposes.

2 Remediation goal split into three goals. Two are for protection of groundwater for two different "hot spots": Proximal is the hot spot closest to the *Groundwater Management Zone* boundary while distal is the hot spot farthest away. The third remediation goal is for direct contact with soil and applies to all of Area 7.

3 Benzene, chloroform and chlorobenzene are not considered chemicals of concern because they were only detected in a small percentage of soil samples (less than 2%).

4 Remediation goal is the Tier 1 residential screening level for soil for protection of groundwater.

5 Remediation goal calculated using equation R15 of TACO that takes attenuation into account.

6 No MCL is available for 1,2-Dichloroethene (total). Therefore, MCL for cis-1,2-Dichloroethene is used to calculate soil remediation objectives as well as to evaluate groundwater contamination.

7 *Soil Saturation Limit* used. TACO stipulates that remediation goals cannot exceed the soil saturation limit. Therefore, when equation R15 of TACO generated a remediation objective greater than the saturation limit, the saturation limit is used instead.

8 2,4-Dinitrotoluene and Dieldrin not included as a chemical of concern because they were not found in the groundwater. 2,4- Dinitrotoluene was detected in one out of three soil samples at concentrations above its Tier 1 residential screening level for ingestion. However, 2,4-Dinitrotoluene was not included as a chemical of concern for the following reasons: the concentration for 2,4- Dinitrotoluene was estimated; it was only detected at five feet below the ground surface; and, it was only detected in 1 out of 3 samples. The sample containing 2,4- Dinitrotoluene is within a hot spot to be addressed by proposed alternatives.

9 Site specific background value. For beryllium, the value is the Upper Tolerance Limit on background data.

The northern hot spot was investigated during Operable Unit Three and the work plan provided for testing designed to identify NAPL. Analysis performed on soil samples obtained in the northern hot spot within Area 7 positively identified NAPL. A total VOC concentration of 875 ppm was identified in the soil sample taken from SB7-201 at 25 feet bgs. NAPL in soils from 25 to 27 feet bgs from SB7-201 was identified visually. In addition, a shaker dye test was performed that confirmed the presence of NAPL from 25 to 27 feet bgs. SB7-201 was terminated at 27 feet, after the boring encountered a clay layer (CDM, 1995 RI 4-48). Many of the compounds detected in the sample obtained from 25 to 27 feet bgs are commonly associated with DNAPLS (U.S. EPA, Groundwater). Additionally, the presence of free product approximately 13 feet below the water table and directly above an impermeable clay layer are indicative of DNAPL.

Concentrations of total VOCs in the central hot spot located just west of the tennis courts are not indicative of NAPL, as evidenced by soil boring SB7-4. Concentrations of total VOCs in the central hot spot include 35 ppm in SB7-4 at 20 feet bgs (CDM, 1995 RI Figure 4-19). Concentrations greater than 1% of a contaminant's solubility are strongly indicative of the presence of NAPL. These concentrations were shown by the shaker dye tests performed in the area (CDM, 1995 RI Appendix A). Headspace analysis results indicate that the most highly contaminated zone within SB7-4 is 20 feet bgs (approximately 10 feet below the water table), and headspace analysis results decrease down to zero at 37 feet bgs helping to rule out the possibility for DNAPL (CDM, 1995 RI Appendix A).

Groundwater

Groundwater samples taken from monitoring wells MW135 and MW106A (located down gradient from Area 7) had concentrations of 1,1,1-TCA at 8 ppm and 7.9 ppm, respectively. Other VOCs detected in the groundwater (down gradient of Area 7) include PCE, TCE, 1,2-DCE (total), vinyl chloride and ethyl benzene. Table 2 identifies concentrations of primary contaminants of concern identified within the groundwater near Area 7.

Surface Water and Sediment

In June 1996, samples were taken from surface water and sediments in the unnamed creek at the north end of Area 7. This was necessary to determine if past activities had affected the creek. Figure 4 illustrates Area 7 surface water and sediment sampling locations. Four creek sediment samples were obtained during the Operable Unit Three remedial investigation. Only one VOC, 1,2-dichloropropane (1,2-DCP) was identified within the sediment. Concentrations of 1,2-DCP ranged up to 0.007 ppm (CDM, 2000 RI 3-22). The PNAs fluoranthene, pyrene, benzo (a) anthracene and chrysene were detected in every sediment sample (CDM, 2000 RI 3-26). Pesticides and PCBs were also detected in the creek sediment

Three surface water samples were obtained from the creek. Six VOCs were detected, 1,1,1-TCA, TCE, 1,1-DCA, 1,1-DCE, 1,2-DCE and chloroethane. There was no discernable pattern in the distribution of contaminants detected in surface water samples. Total VOCs were identified at 0.09 ppm upstream, as compared to 0.065 ppm downstream. Total VOCs in surface water at the confluence of the surface water drainage ditch and the unnamed creek were 0.111 ppm (CDM, 2000 RI 3-26).

On December 16, 1998, Illinois EPA obtained additional samples of the surface water and sediments within the creek. The objective of the sampling event was to provide more information regarding the type and source of contaminants. A total of six samples were taken from the creek - two sediment samples and four surface water samples. Sampling locations for this event are also identified within Figure 4. The December 1998 sampling event identified several compounds that were not detected during the 1996 investigation (Takas). In addition, higher concentrations of several compounds that had been previously detected were identified (Takas). Table 3 summarizes the concentrations of contaminants identified in the sediment during both the 1996 and 1998 investigations. Table 4 summarizes the concentrations of contaminants identified in the surface water during both the 1996 and 1998 investigations. Construction activities on the property south of the creek have resulted in an altering of the creeks natural drainage. Additional sampling may be required because of these activities.

Table 3. Area 7 Creek Sediment Concentrations and Ecological Benchmarks (mg/kg)

Analyte	Sample Locations						Benchmark
	X102	A7CS-4	A7CS-1	A7CS-2	X101	A7CS-3	
Naphthalene (A)	ND	ND	ND	ND	**0.063** (1)	ND	0.0346 (2,3)
Acenaphthene (A)	ND	ND	ND	ND	**0.170**	ND	0.00671 (2,3)
Dibenzofuran (A)	ND	ND	ND	ND	0.091	ND	-
Fluorene (A)	ND	ND	ND	ND	0.180	ND	0.010 (4)
Anthracene (A)	ND	ND	ND	ND	0.240	ND	0.03162 (5)
Carbazole (A)	ND	ND	ND	ND	0.310	ND	-
Fluoranthene (B)	ND	0.590	0.240 J	0.092 J	1.600	0.120 J	0.03146 (4)
Pyrene (B)	ND	0.140 J	**0.086** J	0.042 J	1.300	0.100 J	0.04427 (4)
Benzo(a)anthracene (B)	ND	0.230 J	0.120 J	0.038 J	0.690	0.054J	0.0317 (2)
Chrysene (B)	ND	0.270 J	0.130 J	0.044 J	0.740	0.069 J	0.02683 (4)
Benzo(b) fluoranthene (B)	ND	0.510	0.250J	0.094 J	0.870	0.120J	-
Benzo(a)pyrene (B)	ND	**0.054 J**	ND	ND	0.590	ND	0.0319 (2)
Indeno(1,2,3-cd) pyrene (A)	ND	ND	ND	ND	0.440	ND	0.01732 (4)
Dibenzo(a,h)anthracene (A)	ND	ND	ND	ND	0.110	ND	0.00622 (2,3)
Benzo(g,h,i)perylene (A)	ND	ND	ND	ND	0.390	ND	0.170 (6)
Di-n-butylphthalate (A)	0.110	ND	ND	ND	ND	ND	-
Chloromethane (A)	ND	ND	ND	ND	.013	ND	
Vinyl chloride (A)	0.028	ND	ND	ND	ND	ND	-
Chloroethane (A)	0.014	ND	ND	ND	ND	ND	-
Acetone (A)	0.029	ND	ND	ND	.014	ND	-
1,1-Dichloroethane (A)	0.110	ND	ND	ND	ND	ND	-
1,2-Dichloroethane (total) (A)	0.190	ND	ND	ND	ND	ND	-
1,1,1-Trichloroethane (A)	0.062	ND	ND	ND	ND	ND	-
Heptachlor epoxide (A)	ND				**0.0026**		0.00060 (2)
Barium (A)	101.00	--	--	--	16	--	-
Calcium (A)	8530	--	--	--	29100	--	-
Cobalt (A)	5.10	--	--	--	ND	--	-
Iron (A)	13400.00	--	--	--	6690	--	-
Potassium (A)	1320.00	--	--	--	ND	--	-
Magnesium (A)	5210	--	--	--	14400	--	-
Sodium (A)	551.00	--	--	--	247	--	-
Lead (A)	**88.90**	--	--	--	ND	--	30.20 (3)
Vanadium (A)	31.20	--	--	--	12.1	--	-

Notes:

A Compound not evaluated in March 1999 Ecological Risk Assessment and exceeds existing screening benchmark or no benchmark exists

B Compound detected at concentration higher than that which was evaluated in March 1999 Ecological Risk Assessment

J Value is estimated based on laboratory results

1 Concentrations shown in **bold** exceed ecological screening benchmark

2 Canada interim = Canadian Sediment Quality Guidelines for the Protection of Aquatic Life - Interim Freshwater Sediment Quality Guidelines (ISQGs) http://www.ec.gc.ca/ceqg-rcqe/sediment.htm

3 Florida threshold = Florida Department of Environmental Protection, Office of Water Policy - Sediment Quality Assessment Guidelines (SQAGs) Threshold Effect Levels http://www.dep.state.fl.us/dwm/documents/sediment/default.htm (Table 5, p.77)

4 NOAA lowest threshold = National Oceanic and Atmospheric Administration Screening Quick Reference Tables (SQUIRTs) - Freshwater Sediment Lowest ARCs *H. azteca* Threshold Effect Level (TEL) http://response.restoration.noaa.gov/living/SQuiRT/SQuiRT.html

5 ARCS probable = Assessment and Remediation of Contaminated Sediments (ARCS) Program of National Biological Service for U.S. EPA Great Lakes National Program Office - Probable Effect Concentration (PEC) http://www.hsrd.ornl.gov/ecorisk/reports.html (sediment report, Table 4, p.17)

6 Ontario low = Ontario Ministry of the Environment - Lowest Effect Level http://www.hsrd.ornl.gov/ecorisk/reports.html (sediment report, Table 4, p.17)

Table 4. Surface Water Contaminant Concentrations and Ecological Screening Benchmarks (ug/L)

	Sample Locations							
Analyte	S202	S204	A7SW-3	S203	A7SW-1	A7SW-2	S201	**BENCHMARK**
bis(2-Ethylhexyl) phthalate (A)	ND	ND	ND	13.00	ND	ND	ND	-
Vinyl chloride (A)	48 J	ND	ND	ND	ND	ND	ND	-
Chloroethane (B)	87 J	ND	10	ND	ND	ND	ND	-
Acetone (A)	ND	ND	ND	ND	ND	ND	17.00	-
1,1-Dichloroethene (B)	88	ND	ND	ND	1 J	ND	ND	-
1,1-Dichloroethane (B)	1300.00	ND	30	ND	19	13	ND	-
1,2-Dichloroethene (B)	2200.00	ND	42	ND	54	31	ND	-
Chloroform (A)	10.00	ND	ND	ND	ND	ND	ND	-
Trichloroethene (B)	22.00	ND	1J	ND	1J	ND	ND	-
Xylene (total) (A)	21.00	ND	ND	ND	ND	ND	ND	-
Aluminum (A)	6310	27900.00	--	**7770**	--	--	42.8	5-100.00 (3)
Chromium (A)	7.4	**46.90** (7)	--	14.0	--	--	ND	11, 74 (5)
Copper (A)	9.6	84.90	--	**43.2**	--	--	ND	9.00 (5)
Iron (A)	**9946**	527000	--	**251000**	--	--	**6650**	1000.00 (5)
Lead (A)	11.5	108	--	**54.4**	--	--	ND	2.50 (5)
Antimony (A)	ND	**7**	--	**3.7**	--	--	ND	3.0 (6)
Zinc (A)	49	**340**	--	**193**	--	--	7.6	120.00 (5)

Notes:

A Compound not evaluated in March 1999 Ecological Risk Assessment and exceeds existing screening benchmark or no benchmark exists

B Compound detected at concentration higher than that which was evaluated in March 1999 Ecological Risk Assessment

J Value is estimated based on laboratory results

1 Concentrations in **bold** exceed ecological screening benchmark

2 Illinois EPA Water Quality Criteria

3 Canada = Canadian Water Quality Guidelines for the Protection of Aquatic Life - Freshwater Water Quality Guidelines

4 NOAA = National Oceanic and Atmospheric Administration Screening Quick Reference Tables (SQUIRTs) - Freshwater Acute

5 AWQC = U.S. EPA - Ambient Water Quality Criteria Freshwater Criterion Continuous Concentration (CCC) National Recommended Water Quality Criteria - Correction EPA 822-Z-99-001 April 1999. For chromium, 11ug/L and 74ug/L are the criteria for Chromium +3, and Chromium +6, respectively.

6 NOAA = National Oceanic and Atmospheric Administration Screening Quick Reference Tables (SQUIRTs) - Freshwater Chronic http

7 Concentration is for Chromium +3

SOURCE AREA 9/10

Source Areas Nine and Ten have been combined and evaluated together as Area 9/10. Area 9/10 is an industrial area that is bounded by Eleventh Street on the east, Twenty-third Avenue on the north, Harrison Avenue on the south and sixth street on the west. The properties to the immediate north of Area 9/10, across Twenty-third Avenue, are residential and are zoned as such. South of Area 9/10, across Harrison Avenue, properties are used for both commercial and residential purposes. Area 9/10 is zoned as light industrial, while the properties to the south are zoned mixed residential and commercial (Dust). Future uses for Area 9/10 and adjacent properties planned by the City of Rockford are consistent with current uses (Dust). Figure 5 provides graphical information for Area 9/10. Problems regarding site access and concern over underground utilities at Area 9/10 have limited past investigations and their ability to provide complete and accurate information about the sources located in this area.

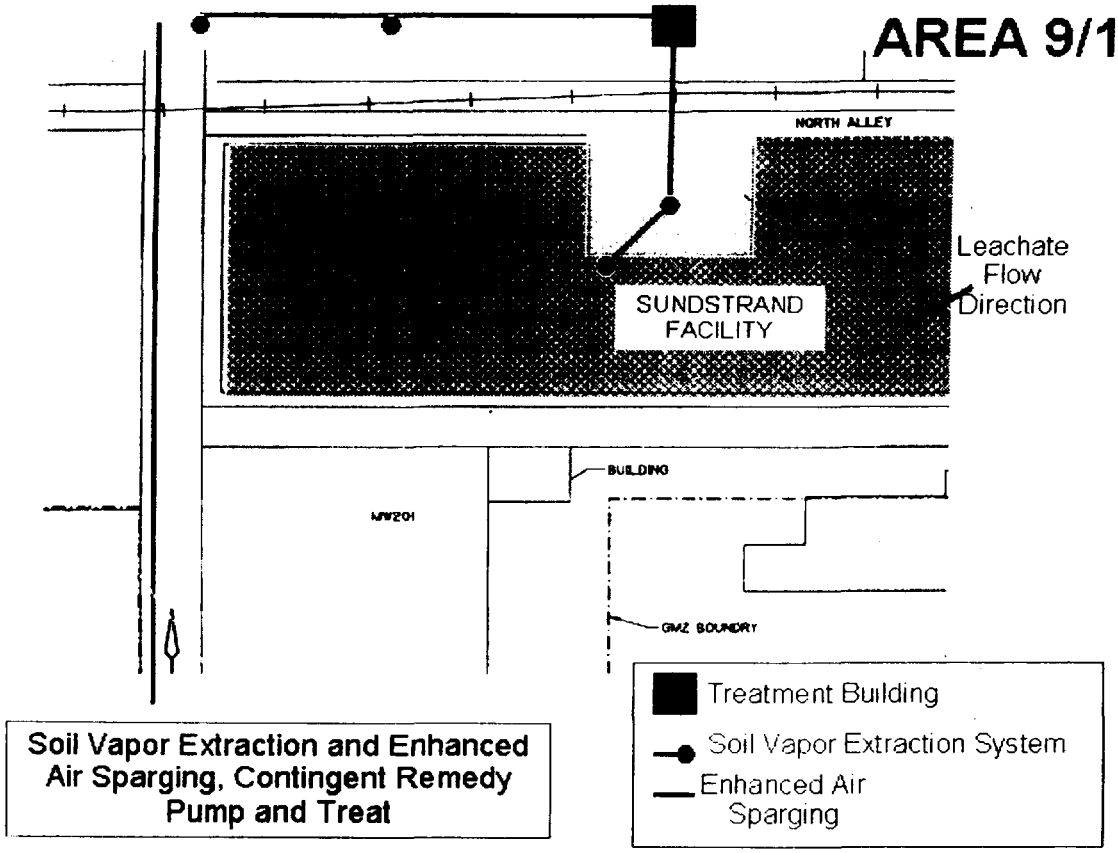


Figure 5. Source Area 9/10 Map

Area 9/10 has a history of industrial activity that extends back as far as 1926, when the Rockford Milling Machine and Rockford Tool companies merged to become the Sundstrand Machine Tool Company, located at the northwest corner of Eleventh Street and Harrison Avenue (Lunden). Current industries that operate in the area include Sundstrand Corporation's Plant #1, Paoli Manufacturing, Rockford Products Corporation, and J.L. Clark. Mid-States Industrial Company

(also known as Rockford Power Machinery) Nylint Corporation, and Rohrbacher Manufacturing were also primary facilities in the area, but are no longer in operation (CDM, 2000 RI 1-7, 3-55). The geology at Area 9/10 is unconsolidated sand and gravel to a depth of at least 101 feet bgs, as determined by SB9/10-201. No clay or silt units were encountered (with the exception of some fill material within eight feet of the ground surface) in the borings conducted by CDM for the Operable Unit Three investigation. Information from boring logs for two borings conducted near the intersection of Ninth and Harrison Avenue indicate that the unconsolidated sand and gravel in Area 9/10 continues to approximately 235 feet bgs, where bedrock is encountered. One of the boring logs from Illinois State Geological Survey well records identifies a till unit from 120 to 130 feet bgs. Borehole drilling just west of Area 9/10 at the intersection of Twenty-third Avenue and Fourth Street indicated that the unconsolidated sediments are at least 169 feet thick, with a 12-foot-thick clay unit from 132 to 144 feet bgs. The water table at Area 9/10 is generally encountered between 30 and 35 feet bgs (CDM, 2000 RI 3-55, 57).

Investigation results, summarized below, indicate that significant sources of VOC contamination exist within Area 9/10. Four primary potential source locations within Area 9/10 were investigated and are discussed below.

Sundstrand Plant #1

Available information regarding Sundstrand Plant #1 (Illinois EPA *104e Requests*; Harding Lawson Associates 1992) documents the existence of three major potential source areas at the facility: (1) the Outdoor Storage Area; (2) the loading dock; and (3) the Waste Recycling Area. Additional sources of contamination include underground storage tanks (USTs) located throughout the facility and other historical solid waste management units (SWMUs). Some of the other SWMUs contained within the facility include a wastewater treatment plant, an old plating area, a sodium dichromate line, an old dichromate line and an old drum wash area. The Outdoor Storage Area, formerly located at the southwest corner of Ninth Street and Twenty-third Avenue, was used to store VOCs. Soils located below this area had elevated concentrations of VOCs. Additionally, an underground storage tank (UST) adjacent to the Outdoor Storage Area was used to store VOCs.

During its history, Plant 1 has contained numerous USTs related to different activities at the facility. These USTs ranged in capacity from 500 gallons to 10,000 gallons, and numbered up to 40 USTs at any one time. Records indicate that many old USTs have been removed or abandoned in place for a variety of reasons, including leaking tanks. Construction of some of the USTs and their associated piping systems include many that were made of steel. The loading dock at Plant #1 has contained approximately 14 USTs at various times between 1962 and 1987. USTs at Plant 1 contained a variety of materials including: chlorinated solvents, stoddard solvent; cutting oils; fuel oils; lapping oil; 1318 oil; rust oil; DTE 25 oil; mineral spirits (7024 or Naphthol spirits); petroleum naphtha; gasoline; and jet fuel (JP4, JP5, and JP8). Some of the tanks within the facility were used to contain waste materials such as: used JP4; used 7024; waste oil; and solvents (PCE, TCE, 1,1,1-TCA, Stoddard). The Waste Recycling Area is the third potential source at Sundstrand's Plant #1. The Waste Recycling Area is located inside the facility, and is up gradient of the west end of the Nylint building (CDM, 2000 RI 3-75,76).

Mid-States Industrial

A drum storage area at the Mid-States Industrial facility (formerly Rockford Power machinery) is another potential source at Area 9/10. Trichloroethene was identified in the shallow soils in this vicinity up to 67 ppm (Fehr-Graham Associates, 1989).

Nylint

Investigations were conducted at the property leased by Nylint during the Operable Unit Three remedial investigation. High concentrations of 1,1,1-TCA were found in soil gas at the west end of the building, suggesting a potential nearby source. Soils samples from the area did not detect elevated VOCs, indicating that soil gas is either migrating from an adjacent area (where soil samples were not collected), or that volatilization from the groundwater is responsible for observed soil gas concentrations (CDM, 2000 RI 3-76).

Rockford Products

Elevated concentrations of VOCs in soil gas (greater than 1,000 ppb) at the Rockford Products facility on Ninth Street indicate this is a potential source. As with Nylint, soil samples from the area did not detect elevated VOCs, indicating that soil gas is either migrating from an adjacent area (possibly beneath the building) or volatilizing from the groundwater. It should be noted that the location of elevated soil gas concentrations is down gradient from Sundstrand Plant #1's Outdoor Storage Area. Migration of VOCs from the Outdoor Storage Area and volatilization from the groundwater could be the cause of elevated soil gas concentrations. Information currently available does not allow for a determination of all sources of contamination in Source Area 9/10.

Soil Gas

The soil gas investigation conducted as a part of the Operable Unit Three investigation identified several portions of Area 9/10 with distinctly high soil gas concentrations. The areas are: 1) west and northwest of the Sundstrand plant (the southeast corner of Twenty-third Avenue and Ninth street); 2) immediately south of the Sundstrand Plant and in the Rockford Product parking lot; 3) immediately north of the Rockford Products building on Ninth Street; 4) the west end of the Nylint building; 5) the Mid-States Industrial facility and 6) the intersection of Ninth Street and Harrison Avenue. Elevated concentrations of chlorinated compounds detected in soil gas include: PCE; TCE; 1,1,1-TCA; 1,2-DCE; 1-1-DCA; and vinyl chloride. Non-chlorinated VOCs detected include BTEX (benzene, toluene, ethylbenzene, and xylene) compounds that were ubiquitous, in small-to-moderate amounts. Table 5 includes total VOCs detected within the soil gas of Area 9/10. (CDM Operable Unit Three RI 3-57).

The soil gas distribution for PCE indicates the presence of significant concentrations (0.100 ppm) on the northwest, west and southwest sides of the Sundstrand Plant on Ninth Street, and in the area just north of Rockford Products, at the intersection of Ninth Street and Harrison Avenue. Trichloroethene concentrations in soil gas greater than 0.100 ppm were found at the southwest corner of the Mid-States building and at the west end of the Nylint building. Concentrations of 1,1,1-TCA were the most significant and pervasive of any soil gas compound in Area 9/10. The largest area of elevated TCA (greater than 0.100 ppm) occurs just south of the west part of Sundstrand Plant #1 and extends south-southwest across Rockford Products parking lot. The

distribution of 1,1,1-TCA closely resembles that of total VOCs shown on Figure 7, Table 7 of CDM Operable Unit Three RI 3-57.

No indoor air analysis was performed in Area 9/10, because the area is mostly industrial and the homes in the area appear to be outside significant areas of groundwater contamination. Also, soil gas concentrations near the homes are low.

Surface Soils

A total of four surface soil samples were obtained in Area 9/10. The only VOC detected was methylene chloride (a common laboratory contaminant). A total of 20 PNAs were detected, including phenanthrene, fluoranthene, pyrene and chrysene. Dieldrin and gamma-Chlordane were the pesticides most often detected. Concentrations of detected metals were not remarkable. Table 5 summarizes the results of Area 9/10 investigations.

File searches revealed records of soil contamination from chlorinated solvents including tetrachloroethylene (PCE), trichloroethene (TCE), 1,1,1-trichloroethane, 1,1 dichloroethene, 1,2 dichloroethane and 1,1,2 trichloroethane. Additional contamination exists in the soil from the release of petroleum fuels such as JP4, JP7, mineral spirits, fuel oil and BTEX compounds. Metals have also been detected in sufficient quantities to be considered a threat to groundwater.

Sub-surface Soils

In areas where access was attainable, analysis of sub-surface soils indicate low concentrations of total VOCs. In soils above the water table, a maximum of 0.050 ppm of total VOCs was identified. The only detections of chlorinated VOCs in soil above the water table occurred at the Sundstrand Plant in borings SB9/10-134, SB9/10-135 and SB9/10-137. Tetrachloroethene, methylene chloride and TCE were the primary chlorinated VOCs detected in soils above the water table. The highest concentration of chlorinated VOCs below the water table was 0.154 ppm, and that was in the soil within the top ten feet beneath the water table (39 to 41 feet bgs). The primary chlorinated VOCs detected in this sample were 1,1,1-TCA and 1,2 DCE. Table 5 summarizes the results of investigations in Area 9/10 (CDM, 2000 RI 3-61,67).

Groundwater

Of all the sources investigated, the plume of groundwater contamination emanating from Area 9/10 has the third highest VOC concentration in the Southeast Rockford Groundwater Contamination Superfund Site (CDM, 1995 RI 4-137). Previous investigations have identified Area 7 as having the highest concentrations of groundwater contamination, followed by Area 8, which had the second highest concentrations. The Operable Unit Two remedial investigation determined that groundwater contamination from Area 8 was not contributing to the overall Southeast Rockford groundwater contamination problem and was dropped from consideration as a part of the Superfund site.

Five monitoring wells in Area 9/10 were sampled as a part of the Operable Unit Three remedial investigation. VOCs were detected in all five locations. Total VOCs above detection limits for two up-gradient wells, MW202 and MW203, were 0.017 ppm and 0.009 ppm, respectively (CDM, 2000 RI Figure 3-34). Monitoring wells MW-5 and MW-4 were installed at the former

Mid-States building (formerly Rockford Power Machinery) for a previous study in 1991 (Fehr-Graham & Associates). Total VOCs above detection limits in wells MW-5 and MW-4 (which are immediately down gradient of the former Mid-States building) are 0.028 ppm and 0.043 ppm, respectively. Groundwater samples obtained from monitoring well MW201 (installed down gradient of Sundstrand Plant #1) contained 18.27 ppm total VOCs above detection limits. Table 5 summarizes the results of past Area 9/10 groundwater investigations (CDM, 2000 RI 3-67, Figure 3-34).

NAPL

The concentration of 12 ppm of 1,1,1-TCA in MW201 indicates that NAPL is likely present in Area 9/10, based on the aqueous solubility limit of 1,1,1-TCA. Field studies have shown that groundwater concentrations greater than 1 percent of a contaminant's solubility are strongly indicative of the presence of NAPL (National Research Council). The concentration of 1,1,1-TCA in MW201 represents 0.8 to 4 percent of its aqueous solubility limit. The source of the dissolved 1,1,1-TCA is located a short distance up gradient (northeast) of the well, between the north end of the Rockford Products parking lot (east of 9th Street) and the Mid-States Industrial property. Furthermore, given the dominance of chlorinated VOCs, which are denser than water, it is likely that a DNAPL is present in the vicinity of MW201. Dye testing did not reveal the presence of DNAPL in the shallower portions of the unconsolidated aquifer. However, DNAPL would not be expected to be present in the more shallow portions of the aquifer, because no confining units are present in the top 100 feet of the aquifer (CDM, 2000 RI 3-77). Further research has revealed that numerous releases of petroleum based fuels (JP4, mineral spirits, and fuel oil) and chlorinated solvents from USTs have occurred within Area 9/10. Information submitted to the Illinois EPA (in reports) reveals that LNAPL related to these releases exists or has existed floating on the water table.

Table 5. AREA 9/10 Contaminant Concentration Ranges and Preliminary Remediation Goals

Contaminant[1]	SOIL (ppm)			GROUNDWATER (ppb)	
	Concentration Range in Soil		Remediation Goal	Concentration	MCL
	Above 10 feet	Below 10 feet			
Volatile Organics					
1,1-Dichloroethene	BDL	0.002	0.06[2]	BDL-**850**	7
1,2-Dichloroethane	BDL	BDL	0.02[2]	BDL-**6** J	5
1,2-Dichloroethene (total)	BDL	BDL	0.4[3]	BDL-**4600**	NA
Ethylbenzene	BDL	BDL	13[2]	BDL-19	700
Methylene Chloride	0.002-0.003	0.003-0.048	0.02[2]	BDL	5
Tetrachloroethene	BDL	0.002-0.046	0.06[2]	BDL-**50** J	5
1,1,1-Trichloroethane	BDL	0.001-0.050	2[2]	BDL-**12,000**	200
1,1,2-Trichloroethane	BDL	0.006	0.02[2]	BDL-**60** J	5
Trichloroethene	BDL	0.001-0.002	0.06[2]	BDL-**140**	5
Vinyl Chloride	BDL	BDL	0.01[2]	BDL-**14**	2
Semivolatile Organics					
Benzo(a)anthracene[4,5]	0.330-**2.30**	BDL	.9[6]	BDL	NA
Benzo (b) Fluoranthene[4,5]	0.420-**2.80**	BDL	.9[6]	BDL	NA
Benzo(a)pyrene[4,5]	0.260-**1.70**	BDL	.3[7]	BDL	NA
Indeno(1,2,3-cd)pyrene[4,5]	0.230-**1.30**	BDL	.9[6]	BDL	NA
Metals					
Beryllium	0.06-0.090	NA	1.51[7]	BDL	4
Pesticides					
Dieldrin[8]	0.004-**0.054**	BDL-0.002	0.004[9]	BDL	NA

Notes:

ppm - Parts per million or milligrams per kilogram

ppb - Parts per billion or micrograms per liter

MCL- Maximum Contaminant Level developed pursuant to Safe Drinking Water Act

J - Value is estimated based on laboratory results

BDL- Below detection limit of laboratory instruments or methods

NA- Compound was not analyzed or measured in laboratory

1 Only compounds that exceed Tier 1 screening level in soil or an MCL in groundwater are included in Table. Remediation objectives shown for all other compounds are only for informational purposes.

2 Remediation Objective is the Tier 1 residential screening level for soil for protection of groundwater.

3 Remediation objective for cis-1,2-Dichloroethane, no objective exists for total 1,2-Dichloroethane

4 Only Tier 1 residential screening levels for soil for direct contact are considered for semivolatiles because semivolatiles are not currently groundwater contaminants and are not expected to become groundwater contaminants.

5 Compound will be evaluated further through sampling during remedial design. Although compound exceeds Tier 1 residential screening level for soil for direct contact, it is not considered a chemical of concern at this time because semivolatiles' are prevalent in environment and not found in groundwater.

6 Remediation Objective is the Tier 1 residential screening level for soil for direct contact.

7 Site specific background value. For beryllium, the value is the Upper Tolerance Limit on background data.

8 Dieldrin not included as a chemical of concern because it was not found in the groundwater. Surface concentration is below Tier 1 residential screening level for soil for direct contact.

9 Remediation Objective is the Tier 1 residential screening level for soil for protection of groundwater.

Source Area Eleven

Source Area Eleven (Area 11) is located east of Eleventh Street at the corner of Eleventh Street and Harrison Avenue (see Figure 6). Area 11 is bordered on the east and west by industrial facilities. Properties to the immediate north are industrial, while land uses further north (north of Twenty-third Avenue) include industrial mixed with some residences. South of Area 11 across Harrison Avenue, properties are used for both commercial and residential purposes. Area 11 continues to be dominated by industrial activities and is comprised of several industrial properties and one commercial property. The Area is zoned light industrial and commercial (Dust). Future uses planned by the City of Rockford are consistent with current uses as light industrial (Dust).

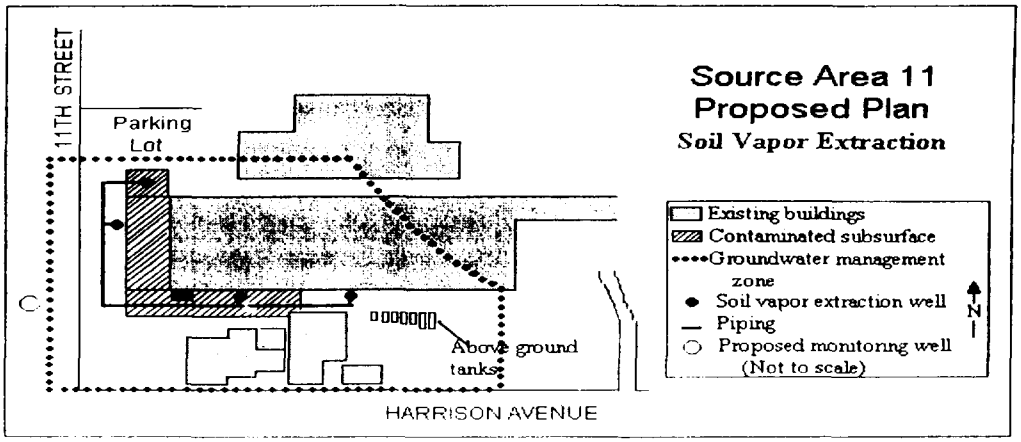


Figure 6. Source Area 11 Map

The geology at Area 11 is unconsolidated sand and gravel to a depth of at least 62 feet bgs, as evidenced by SB11-202 (CDM, 2000 RI Appendix D). Information from boring logs for two borings conducted approximately one block east of Area 11 near the intersection of Ninth and Harrison Avenue indicate that the unconsolidated sand and gravel in the general area continues to approximately 235 feet bgs where bedrock is encountered (CDM, 2000 RI 3-55, 57). One of the boring logs from Illinois State Geological Survey well records identifies a till unit from 120 to 130 feet bgs (CDM, 2000 RI 3-55, 57). The water table at Area 11 was encountered at approximately 20 to 25 feet bgs during the Operable Unit 2 investigation and closer to 30 to 34 feet bgs during the during Operable Unit Three investigation (CDM, 1995 RI Appendix A, CDM, 2000 RI Appendix D).

Area 11 currently includes the Rohr Manufacturing facility (formerly Rockwell Graphics Systems), H and H Wood Products and Pallets, Villa Di Roma Restaurant and adjacent parking lots. Historically, Rockford Varnish, Rockford Coatings and Rockwell Graphics Systems have conducted manufacturing activities in Area 11 (CDM, 2000 RI 1-6).

The Rockford Coatings Corporation, formerly located at 1620 Harrison Avenue, manufactured several paint products including enamels, lacquers and water-based paints. Whether or not chlorinated solvents were used at the facility is unknown. The Rockford Coatings Corporation discontinued operations in 1983 (CDM, 2000 RI 1-6).

Rockford Varnish Company, formerly located at 11th and Harrison Avenue, manufactured varnish and related products for the furniture industry from 1906 until 1983. Rockford Varnish used VOCs, including chlorinated solvents, in its operations and stored these compounds on site in approximately eight aboveground storage tanks. Groundwater sampling results near the facility indicate chlorinated solvent contamination (CDM, 2000 RI 1-6).

Rockwell International Graphics, formerly located at 2524 11th Street, manufactured gears and rollers for newspaper presses until approximately 1991. The facility used 1,1,1-TCA for cleaning rollers until 1983. Areas of concern near the former Rockwell facility include a dumpster located south of Rockwell that apparently leaked cutting oils onto the ground surface and a pit to the north of the property that contained standing water with an oil sheen. The Rockwell facility is now owned by P.H. Partners Co., who leases it to Rohr Manufacturing. Present operations include painting industrial equipment (CDM, 2000 RI 1-6).

Several contaminant release and migration pathways exist in Area 11. One potential contaminant source is the eight aboveground storage tanks that previously contained VOCs (including chlorinated solvents) at the former Rockford Varnish Facility. Potentially leaking tanks and aboveground piping may have released contaminants to the vadose zone of the soil (region just below ground surface where soil pores are filled with air and small amounts of water). Also, a bunker reportedly used by Varnish Company is located in the railroad right-of-way south of the former Rockwell property. This bunker has previously seeped a tar-like substance. Historical reports indicate that a dumpster used by Rockwell Graphics leaked cutting oils onto the ground surface and that a pit to the north of Rockwell contained standing water with an oil sheen (CDM, 2000 RI 3-33).

Investigations conducted at Area 11 identified two distinct zones of subsurface contamination. One zone is located on the western margin of Area 11, centralized beneath Rohr Manufacturing and extending to areas north, south, and west of the building. Soil samples within this zone indicated elevated concentrations of toluene, ethylbenzene, xylene and acetone, as well as the presence of NAPL. A second zone of contamination exists near the aboveground storage tanks to the northeast of the former Rockford Varnish building. Soil samples in this zone identified elevated concentrations of toluene, xylenes and PCE. Within both zones of elevated contamination, the high levels of BTEX masked lower levels of chlorinated VOCs that were likely present. Table 6 summarizes the results of past investigations in Area 11 (CDM, 2000 RI 3-45, 3-51 to 3-53).

Soil Gas

A soil gas survey was conducted at Area 11 during the 1996 Operable Unit 3 remedial investigation to delineate the extent of VOC contamination and to identify any hot spots. A total of 54 soil gas samples were collected. Total concentrations of BTEX in the western zone of contamination ranged from 0.041 ppb to 2.25 ppm. Toluene and xylene are the primary contributors to the total BTEX concentration. Total chlorinated VOCs in the western zone ranged from less than 0.007 ppm to 0.077 ppm. Primary contributors to total chlorinated VOC concentrations appear to be 1,1,1 TCA and PCE. Chlorinated VOC concentrations in the soil gas may be understated due to the presence of elevated BTEX in some samples (CDM, 2000 RI Appendix D).

Total BTEX concentrations in the central zone of contamination ranged from less than 0.006 ppm to 0.180 ppm. Toluene and xylene are the primary contributors to the total BTEX concentration in this zone as well. Total chlorinated VOCs in the central zone ranged from less than 0.013 ppm to 0.224 ppm. Primary contributors to total chlorinated VOC concentrations appear to be 1,1,1 TCA and PCE. As with the western zone, chlorinated VOC concentrations in the soil gas may be understated due to the presence of elevated BTEX in some samples (CDM, 2000 RI Appendix D).

One notable concentration of total chlorinated VOCs in soil gas was located on the north side of the right-of-way at the southeast corner of Rohr Manufacturing. Concentrations of total chlorinated VOCs in the soil gas sample obtained from this area reached approximately 1.049 ppm (CDM, 2000 RI Appendix D).

No indoor air analysis was performed in Area 11 because of the industrial nature of the area and the distance to homes.

Surface Soils

Seven surface soil samples were obtained from Area 11 in locations where elevated VOC concentrations in soil gas were identified. The results are included in Table 6. Surface soil samples identified PNAs, pesticides, PCBs and metals. Volatile Organic Compounds were not detected in surface soils samples. The concentration of PNAs identified ranged from 0.042 ppm to 440 ppm. Several PNAs (phenanthrene, fluoranthene, benzo(a)anthracene, chrysene, bis(2ethyl-hexyl)phthalate, benzo(b)fluoranthene and benzo(k)fluoranthene) were detected in all seven samples. Several pesticides were identified, ranging in concentrations from 0.003 ppm to 0.180 ppm. The pesticides most often detected were Dieldrin, Methoxychlor and alpha-chlordane. Concentrations of PCBs ranging from 0.031 ppm to 0.530 ppm were detected. Metals were identified at concentrations similar to background in most cases (CDM, 2000 RI Table 3-11).

Sub-Surface Soils

Seventeen soil borings were conducted at Area 11. Sub-surface sampling results are summarized in Table 6. VOCs, PNAs, pesticides and metals were identified in sub-surface soils in this area. Concentrations of VOCs ranged from 0.004 ppm to 2,300 ppm. The VOCs most often detected

were xylene, toluene, ethylbenzene, and acetone. Sub-surface soils collected from SB11-203 in the western portion of Area 11 and north of the Rohr Manufacturing building at depths from 39-41 feet bgs tested positive for NAPL. Soils from SB11-203 contained toluene (180 ppm), ethylbenzene (20 ppm), xylenes (110 ppm), and acetone (5.1 ppm). In order to quantify these concentrations of VOCs in the laboratory, the detection limit for chlorinated VOCs (1,1,1 TCA and PCE) was raised to 13 ppm. Therefore, chlorinated compounds may be present at concentrations less than 13 ppm. Soil samples were also taken from SB11-202 from 39-41 feet bgs and tested positive for NAPL. SB11-202 was also located in the western portion of Area 11 but was south of the Rohr Manufacturing building. Concentrations of VOCs within this sample were similar to that of SB-203. Detection limits for chlorinated VOCs were also raised in this sample, to 27 ppm for 1,1,1 TCA and PCE. The thickness of non-chlorinated VOC contamination in the western zone ranges from 12 to 24 feet in an area measuring about 17,000 square feet (CDM, 2000 RI 3-45, 3-51 to 3-53).

Sub-surface samples were also taken from the central portion of Area 11 (the central zone of contamination) near the aboveground storage tanks northeast of the former Rockford Varnish facility. Elevated concentrations of VOCs were also identified within this area, with 290 ppm of toluene and 17 ppm of xylene at 35 feet bgs. The VOC contamination in this zone is limited to the area around and west of the aboveground tanks. Although PCE was detected in sub-surface soils at concentrations of .046 ppm at 20 feet bgs, it is not suspected that the above ground tanks are a source. Levels of chlorinated VOCs in this area are likely due to lateral migration of gases and volatilization from groundwater. The extent of non-chlorinated VOC contamination in this zone extends from 35 feet bgs to an undetermined depth. The area of VOC contamination measures approximately 6,000 square feet (CDM, 2000 RI 3-50, 3-51).

Subsurface concentrations of pesticides, and PNAs were significantly lower than levels found in surface samples and were also detected less frequently. A concentration of PNAs identified in subsurface soils ranged from 0.045 ppm to 1.9 ppm. Concentrations of pesticides ranged in concentrations from 0.001 ppm to 0.009 ppm (CDM, *Risk* Table 10).

Table 6. AREA 11 Contaminant Concentration Ranges and Preliminary Remediation Objectives

Contaminant[1]	SOIL (ppm)			GROUNDWATER (ppb)	
	Concentration Range in Soil		Remediation Goal	Concentration	MCL
	Above 10 feet	Below 10 feet			
Volatile Organics					
Benzene	BDL	BDL-**1.5**	0.189 [2]	BDL-**23**	5
Ethylbenzene	BDL	BDL-**590**	7.983 [2]	BDL-**3,900**	700
Methylene Chloride	BDL	BDL-2.9	2303 [3]	BDL	5
Toluene	BDL	BDL-**1,400**	638 [3]	BDL-**310,000**	1,000
Trichloroethene	BDL	BDL-**0.41**	0.051 [2]	BDL-**170**	5
Xylenes (total)	BDL	BDL-**2,300**	312 [3]	BDL-**16,000**	10,000
Semivolatile Organics					
Carbazole [4, 5]	BDL- **67**	BDL	32 [6]	BDL	NA
Benzo(a)anthracene [4, 5]	0.069-**200**	BDL	.9 [6]	BDL	NA
Chrysene [4, 5]	0.052-**240**	BDL	88 [6]	BDL	NA
Benzo (b) Fluoranthene [4, 5]	0.086-**220**	BDL	.9 [6]	BDL	NA
Benzo (k) Fluoranthene [4, 5]	0.046-**130**	BDL	.9 [6]	BDL	NA
Benzo(a)pyrene [4, 5]	0.096-**150**	BDL	.3 [7]	BDL	NA
Indeno(1,2,3-cd)pyrene [4, 5]	0.063-**120**	BDL	.9 [6]	BDL	NA
2-Methylphenol	BDL-0.031	BDL-0.580	16,827 [3]	BDL	NA
Metals					
Beryllium	0.035-0.070	NA	1.51 [7]	**153**	4
Pesticides					
Dieldrin [8]	BDL-0.010	BDL-0.002	0.004 [9]	BDL	NA

Notes:

ppm - Parts per million or milligrams per kilogram

ppb - Parts per billion or micrograms per liter

MCL- Maximum Contaminant Level developed pursuant to Safe Drinking Water Act

J - Value is estimated based on laboratory results

BDL- Below detection limit of laboratory instruments or methods

NA- Compound was not analyzed or measured in laboratory

1 Only compounds that exceed Tier 1 screening level in soil or an MCL in groundwater are included in this Table. Compounds in bold text are contaminants of concern for soil, and associated remediation objectives shall be attained through remediation. Remediation goals shown for all other compounds are only for information purposes.

2 Remediation goal Calculated using equation R15 of TACO that takes attenuation into account.

3 Soil Saturation Limit used. TACO stipulates that remediation objectives cannot exceed the soil saturation limit. Therefore, when equation R15 of TACO generated a remediation goal greater than the saturation limit, the saturation limit is used.

4 Only Tier 1 residential screening levels for soil for direct contact are considered for semivolatiles because semivolatiles are not currently groundwater contaminants and are not expected to become groundwater contaminants.

5 Compound will be evaluated further through sampling during remedial design. Although compound exceeds Tier 1 residential screening level for direct soil contact, it is not considered a chemical of concern at this time because semivolatiles are prevalent in the environment and not found in groundwater.

6 Remediation goal is the Tier 1 residential screening level for direct soil contact.

7 Site-specific background value. For beryllium, the value is the Upper Tolerance limit on background data.

8 Dieldrin not included as a chemical of concern because it was not found in groundwater. Surface concentration is below Tier 1 residential screening level for soil for direct contact.

9 Remediation goal is the Tier 1 residential screening level for soil for protection of groundwater.

Groundwater

Groundwater analysis performed on samples taken from wells IW10, IW11 and MW128 indicate the presence of VOCs and metals in groundwater down gradient of Area 11. Area 11 is a significant source of non-chlorinated VOC groundwater contamination. Area 11 has the highest and most extensive concentrations of BTEX compounds found in the groundwater. Concentrations of 2 ppm (estimated) ethylbenzene, 310 ppm toluene, and 9.5 ppm xylene were identified in groundwater in the area. Although Area 11 does contribute chlorinated VOC contamination to the groundwater, it appears to be limited in extent and concentration. Concentrations of TCE (0.170 ppm) were higher down gradient of Area 11 than those found up gradient. The chlorinated VOC 1,1,1-TCA was also found in Area 11 groundwater at concentrations up to 0.860 ppm, but could be the result of the Area 4 plume. Table 6 summarizes contaminant concentrations found in groundwater down gradient of Area 11 (CDM, 1995 RI 4-105,106, 118 and Appendix H).

NAPL

The western zone (in the western margin of Area 11) is centralized beneath Rohr Manufacturing. NAPL was detected in the western zone during field screening of SB11-203 soil samples from 39 to 43 feet bgs. A combination of black staining of soils and Sudan IV dye testing confirmed the presence of NAPL in samples taken from 39 to 43 feet bgs. Similar conditions were identified in SB11-202 from 39 to 45 feet bgs. The NAPL in both soil borings was determined to be LNAPL because of its presence within the upper part of the saturated zone. Headspace analysis conducted on samples taken beneath 45 feet bgs in each boring decreased significantly with depth, indicating that DNAPL is not likely to be present in this zone (CDM, 2000 RI 3-45, 51, 52, and Appendix D).

Sub-surface soil samples taken in the central zone of contamination (near the aboveground storage tanks) indicate that VOC contamination in this zone begins at approximately 35 feet bgs. Past investigations in this zone have indicated the possibility for NAPL, but it was not positively identified. Headspace analysis on samples obtained from soil borings SB11-4 and SB11-8, which were advanced during phase II of the Operable Unit Two investigation, indicates the greatest degree of VOC contamination at depths of approximately 35 to 42 feet bgs. Soil samples SB11-4G and SB11-8G taken from these depths indicate the possibility for NAPL. However, no staining is noted in the soil boring logs and the Sudan IV dye test was not performed during the Operable Unit Two investigation. Regarding the possibility for DNAPL,

while minor DNAPL components do exist within soil samples, headspace analysis below 42 feet decrease significantly indicating that DNAPL is probably not present within this zone (CDM, 1995 Operable Unit Two RI 4-66, 4-70, Table 4-4, Appendix A).

The total depth of VOC contamination near the storage tanks cannot be positively determined based on laboratory analysis of soil. However, soil analysis from samples taken near this zone coupled with headspace analysis indicates that it is likely to be approximately 10 feet thick, extending from approximately 35 to 45 feet bgs (CDM, 2000 RI 3-53).

CURRENT AND POTENTIAL FUTURE LAND AND RESOURCES USES

The area included within the Southeast Rockford Groundwater Contamination Site currently includes industrial, commercial and residential property. Industrial property use ranges from what would be considered light-manufacturing facilities up to large facilities that contain multiple underground storage tanks and units utilized in large manufacturing operations. Commercial facilities include shopping facilities such as grocery stores and fast food restaurants that are used as part of normal family activities, including churches and a community center. Residential areas are mixed throughout the entire site, including parks and other recreational facilities. Future uses of the entire area will likely remain the same as they are today.

Source Area 4 is described as an industrial/commercial area in Southeast Rockford that includes the former Swebco Manufacturing located at 2630 Marshall Street. Swebco manufactured precision machine metal parts and was considered to be zoned for light industrial. It was located in an area that included small businesses and single-family homes. Property surrounding Area 4 is currently zoned either residential or light industrial. The City of Rockford has indicated to the Illinois EPA that future property use will be consistent with current use.

Area 7, located in the southeastern portion of the site, was determined to be an illegal dumpsite. The former dumpsite includes Ekberg Park, a municipal park located at the end of Balsam Lane, owned and maintained by the Rockford Park District. Pine Manor subdivision, which contains single-family homes, occupies a position to the northwest of the park. Both Pine Manor subdivision and Ekberg Park are zoned residential and the future plans for these two areas are consistent with current use. Areas to the north, east and south of Area 7 contain undeveloped real estate. However, discussions with Mr. Glen Ekberg, the owner of the property to the north of the park, indicate that this property is in the beginning phases of commercial development.

Area 9/10 is an industrial area, with history of this type of activity dating back as far as 1926. Located in the area of Harrison Avenue and Ninth Street, it is zoned as industrial and is designated to remain that way. However, the areas north of Twenty Third Avenue and directly south of Area 9/10 are primarily residential single-family homes. The City of Rockford has indicated the future use of the property in this area is consistent with current use for Area 9/10.

Area 11 is located on the corner of Eleventh Street and Harrison Avenue and is bordered on the west and east by industrial facilities. Currently, Area 11 is dominated by industrial facilities but does contain one commercial property. Property to the north of Twenty Third Avenue and south of Area 11 consists of a mix of residential, commercial and industrial properties. Currently, the zoning of Area 11 is light industrial and commercial, and future zoning plans are for the area to remain light industrial.

Contaminated groundwater was detected in municipal wells owned by the City of Rockford in 1981, resulting in the closing of several wells. Currently, one City of Rockford municipal well (located within the designated site) is using granulated activated carbon (GAC) filters to remove VOCs from potable water. The GAC unit assures that sufficient potable water supplies exist for

residents within Rockford. Residents with contaminated wells were given the opportunity to hook up to the City of Rockford Municipal water system as part of a time critical removal action in 1991. Through the source control measures and natural attenuation of the groundwater, it is estimated that approximately 200 years will be necessary for complete remediation of the groundwater and to return it to natural conditions. Remedial activities for treatment of soil and leachate at the source areas are expected to continue for approximately twenty-five years. During this time period and after source removal has been completed, groundwater monitoring will continue to assess the quality of the groundwater. The goal of the proposed remedies for the source areas, along with natural attenuation, is to reduce the risk to human health and return the groundwater to a natural, potable drinking water source.

SUMMARY OF SITE RISKS

Risks to human health and the environment caused by contamination from Source Areas 4, 7, 11, and 9/10 (in the form of chlorinated solvents) were first detected in private drinking water wells. Therefore, an evaluation was performed through a risk assessment process. This process characterizes current and future threats or risks to human health and the environment posed by contaminants at the site. The risks to human health and the risks to the environment are usually evaluated separately for each site. A human health risk assessment was conducted for all four source areas, and is discussed below in the section entitled **Human Health Risks**.

Because of the industrial nature of Source Areas 4, 11 and 9/10, the Illinois EPA and U.S. EPA determined it was only necessary to evaluate risks to the environment (often called ecological risks) for Area 7. The results of the ecological risk assessment for Area 7 are discussed below in the section entitled **Summary of Ecological Risk Assessment**.

The calculation of risks to human health and the environment posed by surface water and sediments in the creek running north of Area 7 was problematic. Concentrations of several contaminants (PNAs and VOCs) in the surface water and sediment at Area 7 and their locations in relationship to the area suggest another source may be present upstream. Results of a focused sampling event conducted in December 1998 provided more information regarding the presence of contaminants in the creek, but were unable to establish the contribution of upstream sources to Area 7.

The Agencies determined that it would be more efficient to further evaluate the creek running north of Area 7 during the design phase of the project. The design phase will likely occur in 2002. If the evaluation of risks to human health and the environment conducted during the design phase identifies the need for remediation in addition to that outlined within this ROD, the remedy would be appropriately altered. Depending on the significance of the change in remedy, the Agencies may be required to hold additional public meetings and allow public comment on the new remedy.

SUMMARY OF HUMAN HEALTH RISK ASSESSMENT

The National Contingency Plan (NCP) establishes an expectation that U.S. EPA will use treatment to address principal threats posed by a site wherever practicable (NCP, 40 CFR §300.430(a)(1)(iii)(A)). The term "principal threat" refers to source materials that are considered to be highly toxic or highly mobile that generally cannot be reliably contained or would present a significant risk to human health or the environment should exposure occur (U.S. EPA, Guide 6-40). Remedial investigations conducted at the site have identified principal threat wastes at all four source areas (Area 4, Area 7, Area 9/10, and Area 11). Residual NAPL was positively identified at Areas 4, 7, and 11 (CDM, 2000 RI). At Area 9/10, groundwater concentrations were identified that were indicative of a significant source of groundwater contamination and NAPL presence (CDM, 2000 RI 3-77). The following text summarizes information identifying the principal threats at each Source Area.

Human health risks posed by Source Areas 4, 7, 11, and 9/10 were evaluated and described within the "*Southeast Rockford Source Control Operable Unit Risk Assessment Report*," dated April 2000. The risk assessment utilized Illinois EPA's Tiered Approach to Corrective Action Objectives (TACO) at 35 Ill. Adm. Code Part 742, to evaluate risks. TACO is a set of State of Illinois regulations that specify methods for developing remediation objectives and identifying chemicals of concern. The human health risk assessment conducted at this site used TACO Tier 1 screening values, as well as Risk Assessment Guidelines for Superfund (RAGS) - site specific remediation objectives to evaluate human health risks at each source area.

The risk assessment evaluated three exposure pathways at each source area. An exposure pathway is a means by which a person may come in contact with site contaminants. The three exposure pathways evaluated in the risk assessment are: (1) Direct contact with soil (including ingestion of soils and inhalation of vapors from soils); (2) Chemicals transferring (leaching) from soils into groundwater; and (3) Ingestion of vegetables grown at Area 7. The third exposure pathway was included because portions of Area 7 were used for agricultural purposes.

The major contaminants of concern (COCs) for soil in each source area, as identified by the RI and the Risk Assessment are listed in Table 7. Contaminants of concern are compounds that are present at the site in sufficient quantities to present an unacceptable risk to human health or the environment. Contaminants of concern were identified by comparing concentrations identified within the soil or leachate at each area to preliminary remediation goals. The preliminary remediation goals (PRGs) for this site were generated in accordance with 40 CFR § 300.430 (e)(2)(i) of the National Contingency Plan.

The risk assessment identified conditions at all four source areas that constitute a potential or actual threat to human health or the environment. Concentrations of contaminants present in soil at Areas 4, 7, and 11 exist at levels that are not protective of human health for groundwater consumption. The risk assessment also identified soils at Area 7 that exceed direct contact PRGs for TCE and PCE. In cases where the site concentration exceeds levels protective of human health and the environment, risks to human health are considered unacceptable and remedial alternatives have been developed to address the issue.

Table 7. Contaminants of Concern in Soil

Area 4	Area 7	Area 11	Area 9/10
1,1,1-Trichloroethane	1,1-Dichloroethene	Benzene	None identified
	1,2-Dichloroethene (total)	Ethyl benzene	
	Tetrachloroethene	Toluene	
	1,1,1-Trichloroethane	Xylenes (total)	
	Trichloroethene		
	Xylenes (total)		

As indicated in Table 7, no COCs were identified for Area 9/10. The investigation at Area 9/10 was impeded, due to limited access and concern for underground utilities in the area. Although

no soil samples were obtained that identified soil concentrations above PRGs, remediation is still being considered for this area. Groundwater concentrations beneath Area 9/10 were among the highest identified within the Southeast Rockford study area. The concentration of 12 ppm of 1,1,1-TCA in MW201 indicates that NAPL is likely present in Area 9/10, based on the aqueous solubility limit of 1,1,1-TCA. The likelihood that NAPL is present at Area 9/10 constitutes a principal threat. In accordance with the NCP at §300.430(a)(1)(iii)(A), this ROD formulates treatment alternatives that will address the principal threats posed at each source area.

In accordance with the NCP at 40 CFR §300.430(a)(1)(iii)(A), this proposed plan formulates treatment alternatives that will address the principal threats at each source area, except for the PNAs that were identified as COCs in Areas 4, 11, and 9/10. PNAs are not included in Table 7 as COCs and were intentionally not addressed by the alternatives discussed within this ROD. Additional data are required to determine if PNAs are truly COCs, or are simply contamination from activities not related to the management of hazardous materials. For example, the presence of PNAs in areas with parking lots could be attributed to the asphalt that contains PNAs. Additionally, PNAs would be expected in areas where vehicles may leak motor oil or where scrap wood or other materials are burned. Because PNAs were only detected in a few groundwater samples and their presence in soils may be from normal industrial activities, PNAs are not addressed in this ROD. Additional samples will be obtained in Areas 4, 11 and 9/10 during the remedial design phase that will be conducted in 2002. If the evaluation identifies the need for remediation in addition to that outlined in this ROD, the remedy would be appropriately altered. Depending on the significance of the change in remedy, the Agencies may be required to hold additional public meetings and allow public comment on the new remedy.

In order to be protective, Illinois EPA chose to assume that all of the source areas were, or could become residential areas. Area 7 is currently zoned residential. Areas 4, 9/10 and 11 are all zoned industrial and city plans are consistent with current use. However, because residential areas were nearby Areas 4, 9/10 and 11, and because access to these areas was not entirely limited, residential exposures could occur. Table 8 illustrates the potentially exposed populations at each source area and the estimated associated risks as identified in the Risk Assessment:

Table 8. Exposed Population at Source Areas

Source Area	Exposed Population [1]	
	Resident -Direct Contact	Resident- Protection Of Drinking Water
Area 4	Less than $1x10^{-6}$ and *Hazard Index* of 1[2]	**Greater** than $1x10^{-6}$ or Hazard Index of 1
Area 7	**Greater** than $1x10^{-6}$ or Hazard Index of 1	Greater than $1x10^{-6}$ or Hazard Index of 1
Area 9/10[3]	Less than $1x10^{-6}$ and Hazard Index of 1	Less than $1x10^{-6}$ and Hazard Index of 1
Area 11	Less than $1x10^{-6}$ and Hazard Index of 1	**Greater** than $1x10^{-6}$ or Hazard Index of 1

Notes:

1 The site worker scenario was not evaluated separately from the residential scenario. If concentrations of COCs are protective for residents, it is assumed that concentrations are also protective for site workers since time spent at site would be less.

2 Human health risks are usually evaluated as carcinogenic (those compounds that can cause cancer), and non-carcinogenic (those compounds that can cause harm, but not cancer). For carcinogenic risks, risks are usually quantified as a unit less probability of a person getting cancer. U.S. EPA's generally acceptable risk range for site-related exposures is 10^{-4} to 10^{-6}. The potential for non-carcinogenic effects is evaluated by the ratio of exposure to toxicity, called the Hazard Quotient. Adding all of the Hazard Quotients together generates the Hazard Index. A Hazard Index less than 1 is considered acceptable in that toxic effects are unlikely.

3 The investigation at Area 9/10 was impeded due to limited access and concern over underground utilities in the area.

As mentioned previously, Illinois EPA was unable to quantitatively evaluate human health risks to residents who were exposed to creek surface water and sediments in Area 7. Data obtained from the creek were inconclusive, as the Agencies were unable to identify off-site impacts to the creek. Due to the intermittent nature of the creek and its shallow depths, risks to individuals wading in the creek are expected to be low. However, additional data will be obtained from the creek and risks to human health will be quantitatively evaluated during the design phase.

SUMMARY OF ECOLOGICAL RISK ASSESSMENT

AREA 7

A screening-level ecological risk assessment (ERA) was conducted for Area 7. The ERA focused on the creek running north of Area 7. The ERA's primary purpose was to identify contaminants in the surface water and sediment of the creek that could result in adverse effects to present or future ecological receptors. Receptors are plants or animals that could be impacted by contamination. The overall approach for the ERA at this site was to: 1) Identify chemicals of potential concern (COPC); 2) Identify potential receptors; 3) Identify Exposure Scenarios and 4) Compare measured concentrations in surface water and sediments to concentrations in laboratory tests (ecological screening benchmarks or screening ecotoxicity values) that did not result in significant effects to relevant and sensitive test species (CDM, Ecological).

The results of the ERA determined that at the screening level, risks to organisms (benthic, aquatic and semi-aquatic) living in or nearby the creek were either low or not present at all. However, concentrations of several contaminants (PNAs and VOCs) and their locations in relationship to the site concerned the Agencies. The results did not provide any clear trends because, at some times, concentrations were higher upstream than downstream. This suggests another source may be present upstream.

On December 16, 1998 (after the ecological risk assessment had been conducted), Illinois EPA obtained additional samples of the surface water and sediments within the creek. The objective of the sampling event was to provide more information regarding the type and source of the contaminants in the creek. Results of the December 1998 sampling event identified several compounds that were not detected during the 1996 investigation, and higher concentrations of several compounds that had been previously detected. Tables 3 (sediment) and 4 (surface water) compare measured concentrations in the field in 1996 and 1998 to screening ecotoxicity values to identify compounds that could potentially result in adverse affects to organisms in Area 7.

Upon evaluation of the 1996 and 1998 data, in conjunction with screening ecotoxicity values, the Agencies determined that a more in-depth analysis of ecological risk in Area 7 was necessary. However, because there may be an additional upstream source and the data from the creek is inconclusive, the Agencies determined that it would be more efficient to further evaluate Area 7 during the design phase of the project. The design phase will likely occur in 2002. If the ecological risk evaluation conducted during the design phase identifies the need for remediation in addition to that outlined within this ROD, the remedy would be appropriately altered. Depending on the significance of the change in remedy, the Agencies may be required to hold additional public meetings and allow public comment on the new remedy.

Rock River

The ecological risk assessment conducted for this Operable Unit did not specifically address the impacts that the four Source Areas would have on the Rock River. This assessment was

conducted under the RI/FS for Operable Unit Two. Modeling was conducted on the impacts of groundwater contaminant concentrations on the Rock River through 30- and 50-year scenarios. Both scenarios showed concentrations of chlorinated VOCs entering the river. However, the modeling indicated that even if the four source areas were not remediated, concentrations would not exceed surface water criteria and in fact, are expected to be two orders of magnitude below the criteria. The 50-year scenario did indicate that source area remediation to MCLs occurring within a 10- to 20-year time span would result in measurable reductions in contaminant mass entering the river (CDM, 1995 FS Appendix C). A follow-up review of the modelling and any available analytical data of discharges to the Rock River is planned. This will allow the Illinois EPA to develop a program for monitoring any environmental changes that can be attributed to the plume.

Based on the evaluation of human health and ecological risks, it is the Illinois EPA's judgment that the Preferred Alternative or one of the other active remediation measures considered in this ROD is necessary to protect public health or welfare or the environment from actual or threatened releases of hazardous substances.

REMEDIAL ACTION OBJECTIVES

Remedial Action Objectives (RAOs) provide a general description of what the proposed alternative will accomplish. The following RAOs apply to all four Source Areas:

- Prevent the public from ingestion of soil, and direct contact with soil containing contamination in excess of state or federal standards or that poses a threat to human health;

- Prevent the public from inhalation of airborne contaminants in excess of state or federal standards or that pose a threat to human health; and

- Prevent the further migration of contamination from the source area that would result in degradation of site-wide groundwater or surface water to levels in excess of state or federal standards, or that pose a threat to human health or the environment[1].

Area 7, because of its unique characteristics as a park containing a creek, has these RAOs in addition to the general RAOs listed above:

- Prevent the public from ingestion and direct contact with surface water containing contamination in excess of state or federal standards or that poses a threat to human health;

- Prevent the migration of contamination from Source Area 7 that would result in degradation of surface water and sediment in the unnamed creek to levels in excess of state or federal standards or that pose a threat to human health or the environment; and

- Prevent the ingestion of vegetables from Source Area 7 through the implementation of appropriate institutional controls.

Expected Outcomes of Each Alternative

Preliminary Remediation Goals (PRGs) are identified for each Source Area in Table 1 (Area 4), Table 2 (Area 7), Table 5 (Area 9/10), and Table 6 (Area 11). The PRGs for each area address concentrations of COCs within source materials (contaminated soil, NAPL or leachate).

Soil

The PRGs for soil are based on concentrations designed to be protective of human health for: direct contact with soil (ingestion of soils and inhalation of vapors from soils); ingestion of vegetables grown in the soil; and groundwater ingestion (chemicals leaching from soils into groundwater, causing concentrations in groundwater to exceed either MCLs - if they are available - or risk-based groundwater concentrations). The soil PRGs protective of direct contact

[1]It should be noted that contaminant migration from the source areas has already resulted in site-wide groundwater contamination in excess of state standards. The RAO is intended to remediate each source area in order to prevent further migration of contaminants from the source area.

and groundwater ingestion are established in accordance with the TACO regulations. Soil PRGs protective of ingestion of vegetables were calculated in a manner outside the scope of the TACO regulations (Tier 3 analysis) that was approved by Illinois EPA and U.S. EPA.

Leachate

The Operable Unit Two ROD required source control measures to reduce and control potential groundwater risks to the environment. Based on the Operable Unit Two ROD requirement and because 100% source removal (soil, NAPL, or leachate removal) was impracticable at the four source areas, RAOs were developed with the intent of preventing further migration of contamination from the source area that would increase site-wide groundwater concentrations. These RAOs and resultant alternatives are identified as leachate alternatives and are intended to contain contaminants that have reached the groundwater, because capture at the source was either insufficient or impracticable. In order to simplify the decision-making process, these RAOs and containment alternatives are all identified as leachate alternatives rather than creating numerous sets of alternatives for every possible media (NAPL, leachate, and highly contaminated groundwater) encountered within the four source areas.

As noted previously, site-wide groundwater is already contaminated at levels above state standards, but contaminant levels will begin to decrease due to natural attenuation processes after source area remediation takes place. Source remediation in addition to the creation of a groundwater management zone (GMZ) will achieve PRGs for the leachate. Four separate GMZs (one at each source area) will be established pursuant to Illinois groundwater regulations at 35 Ill. Adm. Code Section 620.450. These regulations allow for the creation of a GMZ as a three-dimensional region containing groundwater being managed, mitigating impairment caused by contamination. The GMZ boundary becomes a perimeter around the site, similar to an imaginary fence, where on the outside of the boundary, groundwater must meet state standards. The four GMZs will encompass the hot spots (and locations surrounding the hot spots) where remediation has, or will have a measurable effect in reducing contaminant concentrations. The PRGs for leachate are based on federal MCLs and must be met at the GMZ boundary. This requirement conforms to the requirements set forth in the Operable Unit Two ROD, i.e., aquifer restoration to drinking water quality and compliance with state drinking water standards.

Intended Use of Preliminary Remediation Goals

Preliminary Remediation Goals finalized within this Record of Decision are then known as remediation goals. Remediation goals (and PRGs prior to ROD completion) for soil protective of direct contact with soil, ingestion of vegetables grown in soil and protective of groundwater are used as criteria, or points of reference within the ROD. These criteria, or points or reference are used to identify technologies applicable to each source area and to identify the extent of the hot spots that the technologies must address. Remediation goals for soil protective of direct contact with soil and ingestion of vegetables grown in soil shall be met in soils at each source area. However, soil remediation goals for protection of groundwater may be superseded by valid and complete empirical data, i.e., groundwater analyses that indicate that Applicable or Relevant

and Appropriate Requirements (ARARs) are consistently met at the GMZ boundary[2]. For example, if a remediation system at an area of concern has been in operation for a reasonable amount of time and groundwater data show that ARARs are being met at the GMZ, the operation of the system could be discontinued (even though soil concentrations are above the PRGs for protection of groundwater).

[2]The terms "Applicable or Relevant and Appropriate Requirements" and "groundwater management zone" are discussed more fully within the **DESCRIPTION OF ALTERNATIVES** section.

SUMMARY OF REMEDIAL ALTERNATIVES

The remedy evaluation process conducted by the agencies compared a number of potential action alternatives and a no-action alternative for each Source Area. Upon a thorough screening of a wide spectrum of in-place (in situ) and above ground (ex-situ) remedial alternatives, the alternatives discussed below were selected for detailed analysis and subjected to evaluation under nine NCP criteria. Remedial alternatives that deal with the site contamination in situ as well as those that treat contaminants after excavation (ex-situ) were evaluated.

Soil alternatives have been developed for Area 4, Area 7, Area 9/10 and Area 11. U.S. EPA has developed a presumptive remedy for soils contaminated by VOCs. Presumptive Remedies are preferred technologies for common categories of sites based on historical remedy selection and engineering studies (U.S. EPA, *Presumptive*). Upon evaluation of U.S. EPA's directive on presumptive remedies for soils contaminated by VOCs, the Agencies determined that the presumptive remedy approach is appropriate for addressing the types of contaminants found in the source areas at the Southeast Rockford site. The directive produced by U.S. EPA identified three technologies as presumptive remedies for VOCs in soil: soil vapor extraction (SVE); thermal desorption and incineration. Of the three technologies, U.S. EPA has identified SVE as the preferred presumptive remedy. The source area presumptive remedies considered practical for this site include SVE and thermal desorption (incineration is usually not a cost-effective remedial alternative unless the site is large, with large amounts of waste needing treatment). SVE works by sucking out the contaminated air that exists in the soil pores beneath the surface. As the contaminated soil pore air is removed, more volatile compounds move from the soil into the soil pores, thereby cleaning up the soil as well as the soil pores. Thermal treatment involves treating the soil by heating it up to a certain temperature where contaminants would volatilize off the soils. Soil remedies have been assembled into remedial alternatives for each source area and are discussed below. In addition to the presumptive remedies for soil, ex-situ bioremediation has also been considered at Area 7 as an alternative to thermal desorption of excavated material.

Contaminated leachate above PRGs is also present at the CMZ boundary at Area 4, Area 7 and Area 9/10. Areas 4, 7 and 9/10 each have contaminated leachate at the GMZ boundary, and the likely presence of NAPL. The U.S. EPA presumptive remedy for VOCs in soil does not address contaminated leachate. Therefore, remedial alternatives were developed and evaluated for leachate that is outside the domain envisioned by the presumptive remedy guidance for VOCs.

No leachate alternatives were developed for Area 11. Although Area 11 has contaminated leachate and LNAPL at the interior of the area, computer modeling conducted for Area 11 indicated that natural processes would meet RAOs for leachate at the site boundary in this area. However, predicting the movement of LNAPLs in the subsurface is complicated. The computer and mathematical models used for this superfund site can only account for the movement of dissolved contaminants and cannot account for the movement of LNAPLs. Concerns also exist at Area 11 regarding high concentrations of BTEX contaminants possibly masking the presence of chlorinated VOCs. In order to provide real data regarding the degradation of contaminants near the site boundary, approximately four additional monitoring wells will be installed during

the design phase. If analysis indicates contaminants are not degrading to levels near MCLs, air sparging will be considered in addition to SVE. Air sparging is included as an alternative to deal with leachate contamination at Areas 4, 7 and 9/10. Air sparging has the added benefit of enhancing biodegradation in both groundwater and vadose zone soils and will address the concerns and RAOs for Area 11.

Every alternative that was selected for detailed analysis for the four source areas is described below in the section entitled **DESCRIPTION OF ALTERNATIVES**. The alternatives that are proposed by the Agencies are identified in Table 9.

Table 9. Proposed Alternatives

Area	Media	Name	Alternative Description
Area 4	Soil	SCS-4D	Excavation, on-site Low Temperature Thermal Desorption
	Leachate	SCL-4B	Leachate containment with collection and treatment, surface water discharge, monitoring, restriction on groundwater usage
Area 7	Soil	SCS-7E	SVE and air sparging[1] at source
	Leachate	SCL-7B	Multi-phase extraction (MPE)[2] , leachate containment with collection and treatment, surface water discharge, monitoring, restriction on groundwater usage
Area 9/10	Soil	SCS-9/10C	SVE
	Leachate	SCL-9/10E	Enhanced Air Sparging[3], monitoring, restriction on groundwater usage
Area 11	Soil	SCS-11C	SVE
	Leachate	SCL-11A	No Action

Notes:

1 Air sparging is a process by which air is injected into the contaminated groundwater. The bubbles generated extract volatile contaminants from the groundwater as they rise to the surface.

2 Multi-phase extraction (MPE) is a remedial technology whereby soil vapors and groundwater are extracted at the same time through the same extraction point. MPE is an enhancement of SVE (SVE just extracts soil vapors).

3 Enhanced Air Sparging - air would be injected into the subsurface to volatilize the contaminant vapors to the vadose zone where they would be removed by vacuum extraction

An alternative that consists of no active remediation (No-Action Alternative) was developed for each source area. The NCP requires a No-Action alternative to be included in the detailed analysis to provide a baseline for comparison to the other alternatives. It should be noted that for the leachate alternatives, a *true,* No Action Alternative could not be developed because groundwater monitoring was required within the 1995 Operable Unit Two ROD. Therefore, for leachate, the No Action Alternative must include one action, that of groundwater (or leachate) monitoring.

Common Elements

Under each alternative, the assumption is made that the City of Rockford's ordinance prohibiting the installation of private wells will be enforced. Also, each alternative requires that a GMZ per

35 Ill. Adm. Code Part 620 be established. Illinois groundwater regulations at 35 Ill. Adm. Code Section 620.450 allow for the creation of a GMZ as a three-dimensional region, containing groundwater being managed, to mitigate impairment caused by contamination. The GMZ boundary becomes a perimeter around the site, similar to an imaginary fence, where on the outside of the boundary, groundwater must meet state standards. The GMZ will remain in effect, providing controls such as remediation, management and monitoring continue at the source area. During the time the GMZ is in effect, State groundwater standards will not be applicable within the GMZ. In addition to source area monitoring, site-wide groundwater monitoring will continue, as required by the Operable Unit Two ROD. Because groundwater monitoring was required within the Operable Unit Two ROD, leachate alternatives entitled "No Action" do include monitoring and will incur some costs.

Within the Southeast Rockford Groundwater Contamination Site there are ten known properties that lie within areas of contaminated groundwater that are using private wells as a water supply. Property owners were notified of the existing situation regarding contaminated groundwater in the area by the U.S. EPA and the City of Rockford and chose not to connect to the City of Rockford water supply system. City of Rockford officials made further attempts and hookup services were denied by the property owners.

Institutional Controls

In order to be protective of human health and the environment, several alternatives described within this ROD require use or access restrictions on contaminated properties within the boundaries of the source area. Use restrictions or access restrictions would be implemented through the use of institutional controls. Institutional controls are administrative or legal constraints that minimize the potential for exposure to contamination by limiting land or resource use. Specific actions taken at sites to restrict access or use could include: Governmental Controls - such as zoning restrictions or ordinances; Proprietary Controls - such as easements or covenants; Enforcement Tools - such as consent decrees or administrative orders; and Informational Devices- such as deed notices or state registries. Several types of access or use restrictions employed simultaneously can increase the effectiveness of institutional controls. The Agencies plan to pursue multiple types of institutional controls at each source area. The approved feasibility study (FS) dated September 5, 2000 discusses institutional controls generally, but often refers to them as "deed restrictions". This ROD refers to institutional controls by name or by the terms "access restrictions" or "use restrictions."

Modeling

In order to help assess each alternative's impact and effectiveness in remediating the soil and leachate contamination at each source area, the computer model BIOSCREEN (U.S. EPA 1996) was used. BIOSCREEN is a program that considers the amount and type of contaminants at a source area and simulates the spread and degradation of those contaminants over time and distance. The program can also consider the impact an alternative would have on the spread and degradation of contaminants at a source area. BIOSCREEN was applied to each alternative to calculate the approximate time (in years) that it would take for the contaminants present at each

source area to meet remedial goals at the GMZ boundary[1]. It is important to note that BIOSCREEN is just a screening model and has certain assumptions built into the program. BIOSCREEN was used at this site to provide general criterion with which to compare the different alternatives. The results of BIOSCREEN, or any screening model cannot be used to predict the exact time it will take for a source area to meet remediation goals. At Areas 4, 7, and 11 each alternative was evaluated individually by BIOSCREEN, assuming that no other alternatives will be selected for that source area. At Areas 4, 7 and 9/10, two remedial alternatives are being proposed, one to address soil contamination, and one to address leachate contamination. Because BIOSCREEN only accounted for a single alternative at each area, and two alternatives are actually being proposed for each area (one for soil and one for leachate), the estimated time frame to achieve remediation action objectives is likely overestimated.

Alternatives Involving Thermal Treatment

Several soil treatment alternatives evaluated for Areas 4, 7 and 11 involve thermal treatment technologies. Thermal treatment technologies address contamination with heat. A common concern regarding some thermal treatment technologies is the formation of products of incomplete combustion such as dioxins or furans. Under certain conditions, the addition of heat to chlorinated organic compounds in the presence of oxygen can produce dioxins and furans. Chlorinated VOCs are present in the soils at Areas 4 and 7. If an alternative is selected that involves thermal treatment, each unit will be pre-tested on site prior to full-scale operation. The pre-test is often called a "proof-of-performance" test. During the proof-of-performance test, air emissions from the stack will be sampled for: total volatile organic compounds; dioxins; and pH. Several other parameters will also be measured during the proof-of-performance testing to ensure that conditions are adequate for destruction of VOCs. These parameters are measured at specific locations within the treatment system and are specific to each type of technology. During the proof-of-performance test, measurements of these parameters are noted and compared with emission rates of various compounds. These measurements are then used as a guide to show that conditions within the treatment system are optimal for efficient system operation and VOC destruction. Following the proof-of-performance test, results from the air sampling for dioxins and furans will be evaluated in a risk assessment to ensure that the treatment systems operate in a manner protective of human health and the environment. If the results of the proof-of-performance tests show that the thermal treatment units are operating properly, full-scale operation will begin. During the proof-of-performance test, as well as full-scale operation, continuous monitoring (of temperature, pH and volatile organic material) will be conducted on each thermal treatment unit. Continuous monitoring will ensure that the unit is running properly and within the correct temperature range to ensure efficient contaminant destruction. In addition, specific air monitoring will occur at scheduled intervals to ensure that, if dioxins and furans are produced, the levels emitted will be protective of human health and the environment.

[1]Due to the lack of information on contaminants in Source Area 9/10, Contaminant spread and dilution could not be accurately modeled.

If a thermal treatment technology is chosen for Area 11, a proof-of-performance test and continuous monitoring will also be implemented there. However, because contaminants are almost entirely non-chlorinated, dioxin/furan testing will be much less intensive.

Thermal treatment at three source areas would also involve a surface water discharge (on site at Areas 4 and 7, off site at Area 11). Water may be utilized in the scrubber unit in combination with a neutralizing material such as calcium sulfate. The water and calcium sulfate serve to remove hydrochloric acid and chlorine gases formed in the thermal treatment unit and will prevent these gases from being vented into the atmosphere. Scrubber water would then be treated for pH and discharged to surface water. Water discharged to the environment would be periodically monitored to ensure it meets the substantive requirements of the National Pollutant Discharge Elimination System (NPDES) regulations.

DESCRIPTION OF THERMAL TREATMENT UNITS

Two types of thermal treatment technologies are included as alternatives within this ROD: catalytic oxidation and Low Temperature Thermal Desorption (LTTD). Catalytic Oxidation is a thermal treatment process that destroys contaminants at low temperatures (compared to most thermal processes) through the use of a catalyst. LTTD is a thermal treatment process that heats up contaminated media in order to volatilize off the contaminants, rather than destroy them. Both thermal treatment technologies are discussed in more detail in the following paragraphs.

Catalytic Oxidation

The catalytic oxidation unit would treat vapors containing compounds extracted from contaminated soil or water. Within the catalytic oxidation unit, oxidation of the organic compound occurs whereby oxygen reacts with the compound containing carbon and hydrogen to form primarily carbon dioxide and water. Oxidation of a chlorinated compound within the catalytic oxidation unit results in the formation of primarily carbon dioxide and hydrochloric acid. The presence of the catalyst, typically a precious metal formulation (platinum or palladium), facilitates the oxidation reaction. The catalyst increases the rate of reaction without being used up in the reaction. Because the catalyst increases the rate of reaction, the reaction can occur at lower temperatures. As such, catalytic oxidation units operate at much lower temperatures (approximately 890° F to 1000° F[4]) than thermal incineration systems (that operate at approximately 1000° F to 1400° F). The primary components of the catalytic oxidation unit are: a liquid/vapor separator, a heat exchanger; a burner (to indirectly pre-heat vapor to 890° F); a catalytic oxidation unit; and a scrubber. Liquid collected in the liquid/vapor separator will be taken off site for disposal at a permitted facility. Water used in the scrubber unit to treat vapor for pH, will itself be treated for pH and discharged to near-by surface water. Discharged water would be monitored periodically to ensure it meets the substantive requirements of the NPDES regulations.

[4]Global Technologies Proposal for CDM May 11, 2000

LTTD

LTTD would treat soils after excavation. The LTTD unit would be direct-fired and would operate at temperatures up to approximately 900° F, which is sufficient to convert the contaminants in the soil to the vapor phase. The LTTD unit is not intended to destroy organic contaminants, but rather to physically separate contaminants from the soil. After contaminants are removed from the soil, the vaporized contaminants are then directed through a bag house to remove particulate matter prior to being introduced to the afterburner. The concentrations of contaminants are expected to be high to require the use of an afterburner. The afterburner is a separate unit that operates at temperatures between 1,600° F and 1,800° F, which is sufficient to convert the contaminants to primarily carbon dioxide, water vapor, and hydrochloric acid. A scrubber would be used to treat the vapor for pH prior to release to the environment. Scrubber water would then be treated for pH and discharged to near-by surface water. Water discharged to the environment would be monitored periodically to ensure it meets the substantive requirements of the NPDES regulations.

Potential ARARs for both thermal treatment technologies include:

- 35 Ill Adm. Code Section 215.301 Section 215.301 states that "no person shall cause or allow the discharge of more than 3.6 kg/hr (8 lbs/hr) of organic material into the atmosphere from any emission unit..." and is applicable to both thermal units;

- Clean Air Act, Section 112(a) Section 112(a) requires that in order to be considered a "minor" source, the emissions of Hazardous Air Pollutants (HAPs)[5] as listed in Section 112(b) of the Clean Air Act (CAA) shall not exceed 10 tons per year of a single HAP or 25 tons per year of any combination of such HAPs; and

- 40 CFR 63.1203 Relevant portions of the standards at 40 CFR 63.1203, which are applicable to hazardous waste incinerators, will be applied to the thermal units identified within this ROD.

[5] Hazardous Air Pollutants as identified within Section 112(b) of the Clean Air Act.

DESCRIPTION OF ALTERNATIVES FOR SOURCE AREAS

Every alternative selected for detailed analysis for the four source areas is described in this section. The description for each alternative includes costs divided into three categories: Capital (costs to construct the remedy); Annual Operation and Maintenance (O&M) (costs necessary to keep remedy operational after construction is complete); and, Total Present Worth (present value of all costs to be incurred over the life of the remedy, assuming a 30-year period pursuant to CERCLA guidance). In addition, the description for each alternative includes discussion of key ARARs that differ from those required by other alternatives. ARARS are generally requirements that must be met regarding either a contaminant that is present, an action being conducted or the location of the source area. The ARARs specified for the entire Southeast Rockford Groundwater Contamination Superfund Site are described more fully.

SOURCE AREA 4

Source Area 4 – Soil

SCS-4A: No Action

For Alternative SCS-4A, no active measures would be undertaken to control or remediate the soil. No use or access restrictions would be imposed. Soil contaminants would remain on-site and would not be reduced in volume, treated or contained. Computer modeling predicted that the time to meet state groundwater standards at the GMZ under this alternative would be approximately 60 to 70 years. There are no costs to implement this alternative.

SCS-4B: Limited Action (restrictions on groundwater and land usage)

Alternative SCS-4B includes placing use restrictions on the contaminated area to prevent installation of drinking water wells and future site development within the soil source area. Soil contaminants would remain on site and would not be reduced in volume, treated or contained. The time to reach state groundwater standards at the GMZ under this alternative would be the same as Alternative SCS-4A, approximately 60 to 70 years. Future source area development would be restricted for approximately 60 to 70 years, when the RAOs would be met. The estimated costs for this alternative are as follows:

Capital:	$28,000
Annual O&M:	$0
Total Present Worth:	$28,000

SCS-4C: Soil Vapor Extraction with vapor treatment by catalytic oxidation

Under this alternative, contaminated soils would be remediated in situ via a SVE system that is the preferred presumptive remedy for soils contaminated with VOCs. A blower would provide a source of negative pressure to extract vapors from the subsurface through a series of wells connected by underground piping. Due to the presence of residual NAPL and a possible scenario of air sparging with steam injection as the remedial action for leachate control, it has been assumed that the wells would be constructed of carbon steel. A pilot-testing program would be conducted prior to the design and construction of the SVE system to determine well spacing and

well construction details. The SVE system would treat all contaminated soils at the site above the water table to remediation goals. Pockets of highly contaminated soils or pockets of NAPL would increase the remediation time frame. Given the presence of residual NAPL at this source area, it is expected that significant quantities of contaminated vapors would be extracted. Vapors extracted from soil would go into a liquid vapor separator. The liquid would be collected in a tank and sent off site for proper treatment and disposal. The vapors would be treated with a catalytic oxidation unit. The time to reach state groundwater standards at the GMZ under this alternative would be approximately 20 to 30 years. It would take approximately 20 to 30 years to meet RAOs for this alternative. The estimated costs for this alternative are as follows:

Capital:	$479,000
Annual O&M:	$135,160
Total Present Worth:	$2,156,000

SCS-4D: Soil Excavation and On-Site Thermal Treatment with low-temperature thermal desorption followed by an afterburner.

Alternative SCS-4D is the proposed alternative for soil remediation at Area 4. LTTD is a presumptive remedy for VOCs in soil, although it is not U.S. EPA's preferred technology. Under this alternative, approximately 2,800 cubic yards of contaminated soils would be excavated and VOCs would be removed through on-site thermal treatment in a LTTD unit. Soil gas analysis indicates that a portion of contaminated soil may be present beneath the former Swebco building. Excavation of soil beneath the building would likely require part of the structure to be demolished and re-built following project completion. Costs for partial building demolition and reconstruction have been included for this alternative.

The majority of the contaminated soil is located below the water table. Therefore, Alternative SCS-4D would include the installation of well points for dewatering at a flow rate of 15 gallons per minute (gpm) to lower the water table to expose the residual NAPL. The water collected during the dewatering process will be contained on site in two 21,000-gallon carbon steel tanks. The tanks would be transported to an appropriate disposal facility at a frequency to be determined during the design phase. The soil would then be excavated and stockpiled for processing. Due to the levels of VOCs expected during excavation, the cost to install a temporary enclosure over the excavation for emissions control has been included. Contaminated vapors would be collected from the temporary enclosure and directed to the afterburner used in conjunction with the LTTD unit.

Excavated soils would first be screened to remove particles greater than four inches in size and then conveyed to the primary treatment unit where the contaminants would be thermally desorbed from the soil and destroyed in the afterburner. Thermally treated soil would then be conveyed to a process unit that cools and re-hydrates the soil. The soil would be stockpiled for testing to ensure that the clean-up goals have been achieved. Production rate of this system is approximately 15 tons per hour, depending on soil type and moisture content. Based on this rate, it would take approximately one month to thermally process the soil. Excavation would be backfilled upon completion of treatment of soil to acceptable levels and would take

approximately 5 to 15 years to meet RAOs for this alternative. Estimated costs for this alternative are as follows:

Capital:	$2,121,000
Annual O&M:	$1,000
Total Present Worth:	$2,121,000

Source Area 4 – Leachate

Currently, no groundwater wells (potable or non-potable) exist within the GMZ of Area 4. All Area 4 leachate remedies include institutional controls to restrict groundwater usage within the GMZ, as well as installation of monitoring wells and implementation of a groundwater and leachate-monitoring program. Groundwater and leachate would be monitored at predetermined intervals for 30 years per RCRA (Resource Conservation and Recovery Act) post-closure groundwater monitoring requirements. Monitoring will typically consist of collecting groundwater and analyzing for VOCs and, where appropriate, parameters that measure biological activity.

SCL-4A: No Action (leachate monitoring, restrictions on groundwater usage)

This alternative would consist of no action with leachate monitoring and institutional controls on groundwater usage for Area 4. Although leachate concentrations would continue to attenuate naturally, this alternative would not comply with RAOs for 60 to 70 years. Estimated costs for this alternative are as follows:

Capital:	$54,000
Annual O&M:	$7,000
Total Present Worth:	$269,000

SCL-4B: Hydraulic Containment (leachate monitoring, leachate containment/collection and treatment and on-site surface discharge, and groundwater use restrictions)

Alternative SCL-4B is the proposed alternative for leachate remediation at Area 4 and would include installation of a leachate containment system, monitoring of the source area leachate and groundwater and implementation of groundwater use restrictions. As part of the leachate containment system, four leachate extraction wells, piping, controls and an air-stripping unit would be installed. Leachate would be extracted from the extraction wells by submersible pumps and directed to an air-stripping unit at a rate of approximately 20 gpm. An air-stripping unit would treat the collected leachate and discharge the treated effluent to an on-site storm water ditch located approximately 200 feet north of the source. The effluent would be monitored periodically for VOCs to confirm that the leachate is treated to acceptable levels.

The treatment method for vapors stripped from the leachate in the air-stripping unit would depend on which soil alternative is implemented. Vapors would be directed to the catalytic oxidation unit if SCS-4C were the chosen soil alternative. Vapors generated by the air-stripping unit as a part of this alternative would be treated by GAC in combination with all other soil alternatives.

This alternative would comply with RAOs after approximately 35 to 45 years. Estimated costs for this alternative account for vapor treatment by GAC and are as follows:

Capital:	$249,000
Annual O&M:	$47,000
Total Present Worth:	$1,117,000

SCL-4C: Install Injection Wells Along Northwestern Boundary of the GMZ/Install Air Sparging Unit/Inject Air/Restriction On Groundwater Usage

Alternative SCL-4C includes the installation of air injection wells and an air-sparging unit. The injection wells would be installed down gradient along the northwestern boundary of the GMZ and screened in the saturated zone. Air would be injected into the subsurface to volatilize the contaminant vapors to the vadose zone, where they would be removed by vacuum extraction. The air sparging system would be required to operate in conjunction with an SVE system, as described in alternative SCS-4C. Vapors produced by air sparging would be collected in the SVE system and directed to the catalytic oxidation unit. Air sparging without SVE would cause migration of the vapors away from the site and might create unacceptable risks to human health and the environment. This alternative would comply with RAOs after approximately 15 to 25 years. The estimated costs for this alternative are as follows:

Capital:	$2,037,000
Annual O&M:	$57,000
Total Present Worth:	$2,522,000

SCL-4D: Reactive Barrier Wall/Leachate Monitoring/Groundwater Use Restrictions

Alternative SCL-4D would include the installation of a 300-foot reactive barrier wall to an average depth of 60 feet bgs down gradient of the source area (on the northwestern boundary of the GMZ). The reactive barrier wall would have a thickness of 2 feet, be comprised of a permeable reactive iron media and be positioned such that it is able to treat the corresponding leachate plume. As the contaminated leachate moved passively through the treatment wall, the contaminants would be removed by sorption onto the iron media. During reactive wall construction, two jetting wells would be installed within the iron media. These jetting wells would allow for rejuvenating the iron media by flushing out solids or biological growth that could foul or clog the reactive wall. The implementation of this alternative would likely be more difficult than the other leachate alternatives, due to required depth of excavation and the presence of underground utilities. This alternative would comply with RAOs for leachate down gradient of the wall immediately upon completion of installation. However, soil concentrations up gradient of the wall would not meet RAOs for some time. The estimated costs for this alternative are as follows:

Capital:	$5,659,000
Annual O&M:	$7,000
Total Present Worth:	$5,911,000

SCL-4E: ***Install Injection Wells Along the Northwestern Boundary of the GMZ and Within the Source Area/Install Air Sparging Unit/Inject Air Restriction On Groundwater Usage***

Alternative SCL-4E includes the same elements as SCL-4C. In addition to the air injection wells installed at the GMZ boundary under SCL-4C, this alternative would include air injection wells located at the source. The addition of air injection wells at the source make this alternative more effective but more costly than alternative SCL-4C. This alternative would comply with RAOs after approximately 10 to 20 years. The estimated costs for this alternative are as follows:

Capital:	$2,306,000
Annual O&M:	$57,000
Total Present Worth:	$2,796,000

SOURCE AREA 7

Source Area 7 – Soil

SCS-7A: ***No Action***

For Alternative SCS-7A, no remedial actions would be undertaken. Soil contaminants would remain on site and would not be reduced in volume, treated or contained. Computer modeling predicted that the time to meet state groundwater standards at the GMZ under this alternative would be approximately 80 to 90 years. There are no costs to implement this alternative.

SCS-7B: ***Limited Action (restrictions on soil usage)***

Alternative SCS-7B includes placing access and use restrictions on contaminated soils. Access and use restrictions would be instituted to prevent future site development. Warning signs and fencing would be installed to discourage unauthorized persons from excavating soils. As with SCS-7A, soil contaminants would remain on site and would not be reduced in volume, treated or contained. This alternative would not comply with RAOs for 80 to 90 years. Estimated costs for this alternative are as follows:

Capital:	$69,000
Annual O&M:	$200
Total Present Worth:	$275,000

SCS-7C: ***Soil Excavation with Ex-Situ, Biological Treatment in Biopiles***

Under this alternative, contaminated soils would be excavated and treated on site. Alternative SCS-7C would include dewatering and excavation of approximately 57,000 cubic yards of material for on-site biotreatment. Although bioremediation is not a presumptive remedy for VOCs in soil, this technology would achieve remediation goals. Alternative SCS-7C would include the installation of well points for dewatering at a flow rate of 10 gpm to lower the water table to expose the residual NAPL. Water collected during the dewatering process would be contained on site in two 21,000-gallon carbon steel tanks and transported to an appropriate disposal facility at a frequency to be determined during the design phase. Soil would then be excavated and stockpiled for processing. Due to the levels of VOCs expected during excavation,

the cost to install a temporary enclosure over the excavation has been included. Contaminated vapors would be collected and passed through granular activated carbon prior to release to the atmosphere.

Excavated soil would be screened to remove all particles greater than two inches in size, although slightly larger particle sizes may be allowable. On-site staging areas would be constructed and soils would be piled on high-density polyethylene (HDPE) liners with fine sand layers above and below to maintain liner integrity. Approximate soil pile dimensions would be six feet tall with the base of the pile measuring 16 feet across and the top of the pile measuring five feet across. Water and nutrients (nitrogen and phosphorus) would be added periodically, as needed, for optimal biological activity. In addition, pH would be controlled by the addition of lime and/or acid. Piping would be installed below the piles within the fine sand layer above the HDPE lines to collect leachate produced by the piles. Following collection, the leachate would be recycled and used for watering the piles, as previously described. A mechanical mixer would blend the soil to enhance microorganism/contaminant interactions and aeration, thereby enhancing biodegradation rates of contaminants. Soils that meet the remediation goals would be placed back into the excavated areas upon approval by the Agencies. Estimated duration for the treatment of the 57,000 cubic yards of soil would be approximately 5 years. Although actual soil treatment would be completed in 5 years, this alternative would comply with RAOs after approximately 15 to 25 years when ARARs are met at the GMZ. Estimated costs for this alternative are as follows:

Capital:	$15,647,000
Annual O&M:	$627,000
Total Present Worth:	$18,218,000

SCS-7D: Excavation and On-Site Thermal Treatment with low-temperature thermal desorption followed by afterburner

Under this alternative, approximately 57,000 cubic yards of contaminated soils would be excavated for on-site thermal treatment via a LTTD unit. LTTD is a presumptive remedy for VOCs in soil, although it is not U.S. EPA's preferred technology. In this alternative, soils excavation, site dewatering/treatment and excavation enclosure would all be performed as described for alternative SCS-7C. Excavated soils would be screened to remove particles greater than four inches in size and then conveyed to the LTTD unit. Following the primary treatment unit where the contaminants would be vaporized from the soil, contaminant vapors would be destroyed in the afterburner. Treated soil would then be conveyed to a process unit that cools and re-hydrates the soil and stockpiles the soil for testing (to ensure that the clean-up goals have been achieved). The production rate of this system ranges from 80 to 120 tons per hour, depending on soil type and moisture content. Based on this rate, the estimated duration of the thermal treatment would be eight months. Although actual soil treatment would be completed in eight months, this alternative would comply with RAOs after approximately 10 to 20 years. Estimated costs for this alternative are as follows:

Capital:	$15,124,000
Annual O&M:	$85,000

Total Present Worth: $15,209,000

SCS-7E: Soil Vapor Extraction and Air Sparging System with vapor treatment by catalytic oxidation

Alternative SCS-7E is the proposed alternative for soils at Area 7. SVE is the preferred presumptive remedy for soils contaminated with VOCs. This alternative would combine soil vapor extraction and air sparging technologies to address contaminants in unsaturated and saturated soil and leachate in Source Area 7. Under this alternative, unsaturated and saturated contaminated soils would be remediated in situ via a vapor extraction system. This alternative would consist of the installation of a series of wells connected by an underground piping system. A blower would provide a source of negative pressure to extract vapors from the subsurface. Sixteen vacuum extraction wells would be placed in the suspected source areas. Extraction wells would be constructed to a depth of up to 25 feet and screened in the vadose zone, where they would extract volatile contaminants from the unsaturated zone, as well as some leachate contaminants, which are able to volatilize from the surface of the water table. The estimated flow rate for the SVE system would be 1200 standard cubic feet per minute (scfm). A pilot test would be conducted prior to system design to determine well construction, extraction flow rate, and spacing.

The air sparging system would be constructed to volatilize VOCs from saturated soils and leachate through the injection of air and the collection of VOCs using vapor extraction wells. A total of 53 air sparging wells would be constructed to a depth of 50 feet bgs. Camp Dresser and McKee has assumed a radius of influence of 25 feet for the air sparging wells. Two air compressors would be used to inject air to the subsurface, each at a rate of 400 scfm, for a total of 800 scfm. However, a pilot study would be conducted to verify flow rate and the radius of influence prior to full-scale implementation.

Given the presence of residual NAPL, it is expected that significant concentrations of contaminated vapors would be extracted. The extracted vapors would be treated with a catalytic oxidation unit. Carbon adsorption would not be a cost-effective technology for treating the vapor upon startup of the soil vapor extraction systems. However, carbon adsorption could be used to address contaminants in the vapor after contaminant levels were reduced by catalytic oxidation for a period of up to six months to one year. This alternative would comply with RAOs after approximately 15 to 25 years. Estimated costs for this alternative are as follows:

Capital:	$3,071,000
Annual O&M:	$320,000
Total Present Worth:	$5,624,000

Source Area 7 – Leachate

Area 7 leachate remedies include institutional controls on groundwater usage within the GMZ, as well as installation of monitoring wells and implementation of a groundwater and leachate-monitoring program. Groundwater and leachate would be monitored at predetermined intervals for 30 years per RCRA post-closure groundwater monitoring requirements. Monitoring would

typically consist of collecting groundwater and analyzing for VOC and, where appropriate, parameters that measure biological activity.

SCL-7A: No Action (leachate monitoring and restrictions on groundwater)

This alternative would consist of no action, with leachate monitoring and institutional controls on groundwater usage for Area 7. Leachate concentrations would continue to attenuate naturally. This alternative would comply with RAOs after approximately 80 to 90 years. Estimated costs for this alternative are as follows:

Capital:	$67,000
Annual O&M:	$9,000
Total Present Worth:	$347,000

SCL-7B: Multi-Phase Extraction/Leachate Containment/Collection with Treatment by Air Stripping/On-site Surface Discharge/Groundwater Use Restrictions

Alternative SCL-7B is the proposed alternative for Area 7 leachate. This alternative was designed to complement soil alternative SCS-7E and would include the installation of a multi-phase extraction (MPE) system in the source and a leachate containment system along the down-gradient side of the GMZ. The leachate containment system would consist of eight leachate extraction wells, a central pump station, an air-stripping unit, piping and controls. Source area leachate would be collected via the leachate extraction wells to be located northwest of the park play ground area. The leachate would be extracted and pumped to the air-stripping unit at a rate of 10 gpm, with the treated effluent from the air stripper discharged to the unnamed creek located approximately 450 feet north of the source. The treated effluent would be periodically monitored to confirm discharge criteria are being met. Vapors from the air-stripping unit would be treated in the catalytic oxidation unit installed as a component of Alternative SCS-7E.

Ten MPE wells (approximately 25 feet deep) would be installed in the source and connected by underground piping to a central vacuum pump/vapor treatment system enclosure. The enclosure would include an air/water separation system, with the water pumped to the leachate containment system air stripper. Air from the air/water separation system would be sent to the catalytic oxidation unit. This alternative would comply with RAOs after approximately 30 to 40 years. Estimated costs for this alternative are as follows:

Capital:	$1,435,000
Annual O&M:	$128,000
Total Present Worth:	$2,637,000

SCL-7C: Reactive Barrier Wall/Leachate Monitoring/ Groundwater Use Restrictions

Alternative SCL-7C would include the installation of a two-foot-thick reactive barrier wall that would consist of a funnel and gate system. The funnel wall component of the funnel and gate system would direct the contaminated leachate plume to the reactive treatment wall. The reactive barrier wall is comprised of a permeable reactive iron media that would be able to treat the corresponding leachate contaminants to acceptable levels. The reactive wall would include jetting wells that would flush out particulate matter or biological growth that could clog or foul

the iron media. Alternative SCL-7C also requires the installation of 310- and 420-foot funnel walls north and west of the source area leachate plume. The two funnel walls would be joined together with a 210-foot reactive gate positioned between the walls. The western funnel wall would be tied into bedrock at approximately 50 feet bgs, while the northern funnel wall and reactive gate would be extended to a depth of 80 feet bgs. This alternative would comply with RAOs for leachate on the down-gradient side of the wall immediately, upon completion of installation. However, soil concentrations up gradient of the wall would not meet RAOs for some time. Estimated costs for this alternative are as follows:

Capital:	$4,104,000
Annual O&M:	$8,000
Total Present Worth:	$4,391,000

SOURCE AREA 9/10

The description of each alternative for Areas 4 and 7 contains estimates based on computer modeling of the time required to meet state groundwater standards at the GMZ boundary. However, no computer modeling could be performed for Area 9/10 soil and leachate alternatives, because of the inability to gather data in the area. Therefore, the time to meet RAOs under each alternative for Area 9/10 is discussed qualitatively, in comparison to one another.

Source Area 9/10-Soil

SCS-9/10A No Action

For alternative SCS-9/10A, no remedial actions would be undertaken. Soil contaminants would remain on-site and would not be reduced in volume, treated, or contained. There are no costs to implement this alternative.

SCS-9/10B Limited Action (restrictions of future development)

Alternative SCS-9/10B includes placing use restrictions on the contaminated area to prevent future site development. As with SCS-9/10A, soil contaminants would remain on-site and would not be reduced in volume, treated or contained. This alternative would take the same amount of time as alternative SCS-9/10A to reach RAOs. Estimated costs for this alternative are as follows:

Capital:	$28,000
Annual O&M:	$0
Total Present Worth:	$28,000

SCS-9/10C: Soil Vapor Extraction with vapor treatment using activated carbon

Alternative SCS-9/10C is the proposed alternative for soils at Area 9/10. Under this alternative, contaminated soils would be remediated in situ via a SVE system. SVE is the preferred presumptive remedy for soils contaminated with VOCs. This alternative would consist of the installation of a series of wells connected by an underground piping system. A blower would provide a source of negative pressure to extract vapors from the subsurface. Extraction wells

would be screened in the vadose zone, where they would remove the contaminants from the unsaturated zone, as well as leachate contaminants that might diffuse from the surface of the water table. A pilot program would be conducted prior to the design of the SVE system to determine well spacing and in situ air permeability.

Vapors collected from the SVE unit would be treated through the use of activated granular carbon. Activated granular carbon could be used to treat vapors at this area (as opposed to catalytic oxidation at Areas 4 and 7) because of the lower-expected concentrations of contaminants from soils. The vapor treatment scenario may have to be reevaluated based upon additional data collection from Area 9/10 and the results of the SVE pilot program. This alternative would meet RAOs in the shortest period of time of all other Area 9/10 soil alternatives. Estimated costs for this alternative are as follows:

Capital:	$225,000
Annual O & M:	$329,000
Total Present Worth:	$4,308,000

Source Area 9/10 – Leachate

All Area 9/10 leachate remedies include institutional controls on groundwater usage within the GMZ, installation of monitoring wells and implementation of a groundwater and leachate monitoring program. Groundwater and leachate would be monitored at predetermined intervals for 30 years, per RCRA post-closure groundwater monitoring requirements. Monitoring would typically consist of collecting groundwater and analyzing for VOCs and, where appropriate, parameters that measure biological activity.

SCL-9/10A: No Action (leachate monitoring and restrictions on groundwater usage)
This alternative would consist of no action with leachate monitoring and institutional controls on groundwater usage. Leachate concentrations would continue to attenuate naturally. Future source area development would be restricted for the longest period time under this alternative, as it would take the longest to reach RAOs. Estimated costs for this alternative are as follows:

Capital:	$60,000
Annual O&M:	$5,000
Total Present Worth:	$217,000

SCL-9/10B: Hydraulic Containment (leachate monitoring, leachate containment collection and treatment by air stripping, off-site surface discharge and groundwater use restrictions)
The Hydraulic Containment alternative would include installation of a leachate containment system. As part of the leachate containment system, 55 leachate extraction wells, piping, controls and an air-stripping unit would be installed. Wells would be used, rather than a deep trench to protect the adjacent building structure. Source-area leachate would be collected in leachate extraction wells installed west and south of the Sundstrand Plant #1. Extracted leachate would be sent via pumps to the air-stripping unit at a rate of 50 gpm. Vapors collected from the

air-stripping unit would be treated by granular activated carbon and released to the atmosphere. Treated water from the air-stripping unit would be discharged off site to a storm water ditch located approximately 2,000 feet south of the source. This leachate alternative would achieve RAOs more quickly than SCL-9/10A, but not as quickly as the air sparging conducted under alternative SCL-9/10C. Estimated costs for this alternative are as follows:

Capital:	$1,326,000
Annual O&M:	$42,000
Total Present Worth:	$2,440,000

SCL-9/10C: Install Injection Wells along the Southwestern GMZ Boundary/Install Air Sparging Unit/Inject Air/Restriction On Groundwater Usage

Alternative SCL-9/10C includes the installation of air injection wells (along the southwestern boundary of the GMZ) and an air-sparging unit. Injection wells would be installed along the GMZ boundary to contain and treat the source area leachate. Air would be injected into the subsurface to volatilize the contaminant vapors to the vadose zone, where they would be removed by vacuum extraction. The air sparging system would be required to operate in conjunction with an SVE system such as described in alternative SCS-9/10C. Vapors produced by air sparging would be collected in the SVE system. This alternative would achieve RAOs in a short amount of time, but slightly longer than that required by SCL-9/10E. Estimated costs for this alternative are as follows:

Capital:	$2,293,000
Annual O&M:	$65,000
Total Present Worth:	$3,208,000

SCL-9/10D: Reactive Barrier Wall/Leachate Monitoring/Restrictions on Groundwater Usage

SCL-9/10D was the proposed alternative for leachate at Area 9/10. Alternative SCL-9/10D would include the installation of a reactive barrier wall that would consist of a funnel and gate system. The reactive barrier system would be constructed of iron media to treat the leachate as it flows through the reactive wall. Reactive barrier wall construction would include jetting wells to flush-out particulate matter or biological growth that could foul or clog the iron media. This alternative would comply with RAOs for leachate immediately upon completion of installation. However, soil concentrations up gradient of the wall would not meet RAOs for some time. Estimated costs for this alternative are as follows:

Capital:	$3,329,000
Annual O&M:	$5,000
Total Present Worth:	$3,523,000

SCL-9/10E: Install Injection Wells Along Boundary of the GMZ and Source Area/Install Air Sparging Unit/Inject Air/Restriction On Groundwater Usage

Alternative SCL-9/10E is essentially the same as Alternative SCS9/10C, except that additional air sparging wells would be installed at the source area in addition to the GMZ boundary. As

with Alternative SCS-9/10C, the air sparging system would be required to operate in conjunction with an SVE system as described in alternative SCS-9/10C. Vapors produced by air sparging would be collected in the SVE system. This alternative would achieve RAOs in a relatively short amount of time, second only to Alternative SCL-9/10D. Estimated costs for this alternative are as follows:

Capital:	$2,697,000
Annual O&M:	$65,000
Total Present Worth:	$3,619,000

SOURCE AREA 11

Computer modeling performed for Area 11 predicted that for any alternative, dissolved contaminants would meet state groundwater standards at the GMZ boundary prior to intersecting the GMZ boundary. However, free product NAPL exists at the interior of the site and represents a principal threat. With the exception of SCS-11A (No Action), the alternatives evaluated for Area 11 are designed to address overall soil contamination, including free product NAPL.

Source Area 11 – Soil

SCS-11A: No Action

For Alternative SCS-11A, no remedial actions would be undertaken. Soil contaminants would remain on-site and would not be reduced in volume, treated or contained. Free product NAPL is present at the interior of Area 11 and soil remediation objectives would not be met for some time. This alternative would take the longest amount of time to meet soil remediation objectives and RAOs at the interior of the site. There are no costs to implement this alternative.

SCS-11B: Limited Action (restrictions on future site development)

Alternative SCS-11B includes placing use restrictions on the contaminated area. Institutional controls would be implemented to prevent future site development. As with alternative SCS-11A, soil contaminants would remain on site and would not be reduced in volume, treated or contained. This alternative would require the same amount of time to achieve soil remediation objectives and RAOs as alternative SCS-11A. The estimated costs for this alternative are as follows:

Capital:	$28,000
Annual O&M:	$0
Total Present Worth:	$28,000

SCS-11C: Soil Vapor Extraction with vapor treatment, using catalytic oxidation

This is the proposed alternative for Area 11 soils. Soil Vapor Extraction is the preferred presumptive remedy for soils contaminated with VOCs. Under this alternative, contaminated soils would be remediated in situ via a vapor extraction system. This alternative would consist of the installation of a series of wells connected by an underground piping system. A blower would provide a source of negative pressure to extract vapors from the subsurface. Five vacuum-extraction wells would be placed in the source area. The extraction wells would be screened in

the vadose zone, where they would remove volatile contaminants from the unsaturated zone, as well as some leachate contaminants that may diffuse from the surface of the water table. Due to the presence of NAPL, it has been assumed that the wells would be constructed of carbon steel in case steam injection is required. A pilot program would be conducted prior to system design to determine well construction, spacing and in situ air permeability.

Given the presence of residual NAPL, it is expected that significant quantities of contaminated vapors would be extracted. The vapors would initially be treated with a catalytic oxidation unit. Carbon adsorption would not be a cost-effective technology for treating the vapor upon startup of the soil vapor extraction system. It is possible that carbon adsorption could be used to address contaminants in the vapor after contaminant concentration levels were reduced by using catalytic oxidation for a period of six months to one year. This alternative would achieve soil remediation objectives and RAOs in the shortest amount of time of all alternatives evaluated for Area 11. Estimated costs for this alternative are as follows:

Capital:	$543,500
Annual O&M:	$212,880
Total Present Worth:	$3,185,500

Source Area 11 – Leachate

No remedial alternatives (with the exception of the No Action Alternative) were developed for Area 11 leachate. The BIOSCREEN results indicate that even though LNAPL is present in the interior of the area, groundwater would meet state groundwater standards at the GMZ boundary. BIOSCREEN accounted for the 150 feet between the hot spot at Area 11 and the GMZ boundary. Modeled concentrations of benzene, xylene and TCE dropped below groundwater standards within 75 feet down gradient of the elevated soil concentrations (CDM, 2000 RI Appendix B). However, due to the presence of free product NAPL at the interior of the site, institutional controls on groundwater usage within the GMZ would be implemented, approximately four monitoring wells would be installed and a groundwater and leachate monitoring program would be executed.

SCL-11A: No Action (leachate monitoring and restrictions on groundwater usage)
This alternative would consist of no action with leachate monitoring and institutional controls on groundwater usage. Leachate concentrations would continue to attenuate naturally. The groundwater and leachate would be monitored at predetermined intervals for 30 years per RCRA post-closure groundwater monitoring requirements. Monitoring would typically consist of collecting groundwater and analyzing for VOCs and, where appropriate, parameters that measure biological activity. Future area development would be restricted under this alternative. Estimated costs for this alternative are as follows:

Capital:	$54,000
Annual O&M:	$8,000
Total Present Worth:	$297,000

COMPARATIVE ANALYSIS OF ALTERNATIVES

This section explains the Illinois EPA's rationale for selecting the preferred alternatives. The U.S. EPA has developed nine criteria to evaluate remedial alternatives to ensure that important considerations are factored into remedy-selection decisions. These criteria are derived from the statutory requirements of CERCLA Section 121, as well as other technical and policy considerations that have proven to be important when selecting remedial alternatives. The nine criteria are identified and described in the chart below.

The FS for Operable Unit Three presented detailed analysis for 28 different alternatives. Because the two Modifying Criteria cannot be fully evaluated until public comment is received, they were not evaluated in the FS. The reader is urged to read the responsiveness summary for more detailed discussion of public comment received. Detailed analysis of the remaining 7 criteria for each alternative is summarized below. Due to the large number of alternatives, an in-depth, detailed analysis for each is not provided. Additionally, the alternatives are evaluated in groups, by source area and media (soil or leachate). The No Action Alternative will only be discussed for Area 11 leachate, as it failed to be protective of human health and the environment in all other cases. References to all alternatives in discussions below should be considered to exclude the No Action Alternative, as well as any other alternatives specific to the subject source area and media that do not meet threshold criteria.

DESCRIPTION OF EVALUATION CRITERIA

Threshold Criteria

The two most important criteria are statutory requirements that must be satisfied by any alternative in order for it to be eligible for selection.

1. **Overall protection of human health and environment** addresses whether or not a remedy provides adequate protection and describes how risks posed through each pathway are eliminated, reduced or controlled through treatment, engineering controls or institutional controls.

2. **Compliance with *ARARs*** addresses whether or not a remedy will meet all of the Applicable or Relevant and Appropriate Requirements of other Federal and State environmental statutes and/or provide grounds for invoking a waiver.

Primary Balancing Criteria

Five primary balancing criteria are used to identify major trade-offs between remedial alternatives. These trade-offs are ultimately balanced to identify the preferred alternative and to select the final remedy.

1. **Long-term effectiveness and permanence** refers to the magnitude of residual risk and the ability of a remedy to maintain reliable protection of human health and the environment over time, once cleanup goals have been met.

2. **Reduction of toxicity, mobility, or volume through treatment** is the anticipated performance of the treatment technologies that may be employed in a remedy.

3. **Short-term effectiveness** refers to the speed with which the remedy achieves protection, as well as the remedy's potential to create adverse impacts on human health and the environment that may result during the construction and implementation period.

4. **Implementability** is the technical and administrative feasibility of a remedy, including the availability of materials and services needed to implement the chosen solution.

5. **Cost** includes capital and operation and maintenance costs.

Modifying Criteria
These criteria may not be considered fully until after the formal public comment period on the Proposed Plan and RI/FS Report are complete. However, Illinois EPA and U.S. EPA work closely with the community throughout the project.

1. **State Acceptance** indicates whether, based on ts review of the RI and Proposed Plan, the State concurs with, opposes or has no comment on the preferred alternative. While the NCP speaks in terms of State Acceptance, in this instance, Illinois EPA is the lead agency, with the support of the U.S. EPA. Hence, for this case, the term "Support Agency" is more appropriate.

2. **Community Acceptance** will be assessed in the Record of Decision following a review of the public comments received on the RI report and the Proposed Plan

AREA 4 SOIL

In addition to the No Action alternative, Alternative SCS-4B will not be discussed within this section because it failed to meet either of the threshold criteria. A summary of the detailed analysis for Area 4 Soil is provided below for Alternatives SCS-4C (SVE) and SCS-4D (Excavation with LTTD).

Overall Protection of Human Health and the Environment
Both SCS-4C and SCS-4D are protective of human health and the environment. SCS-4D achieves soil remediation objectives in less than 1 year.

Compliance with ARARs
Both alternatives comply with ARARs.

Long-term Effectiveness and Permanence
Alternative SCS-4D is more permanent (soils are removed and treated) than SCS-4C and has less residual risk once excavation is complete. Also, SCS-4D does not require any long-term operation and maintenance, whereas the SVE system under SCS-4C would require maintenance until remediation objectives are met after approximately 20 - 30 years.

Reduction of Toxicity, Mobility, or Volume through Treatment
Alternative SCS-4D achieves a higher degree of reduction of toxicity, mobility and volume of contaminants as opposed to SCS-4C. Under SCS-4D, greater than 90% of contaminant mass would be removed as compared to 85% removal using SCS-4C.

Short-term Effectiveness
Alternative SCS-4C results in a smaller short-term health risk to on-site workers and the surrounding community, as the contaminants are left in place. Under the SCS-4D, the contaminants would be excavated, providing more of an opportunity for exposure, but improved rate of contaminant removal.

Implementation
Both alternatives are technically easy to implement. Some space considerations must be made with alternative SCS-4D, as the treatment unit will be larger than that under SCS-4C.

Cost
The total present worth costs for Alternative SCS-4C is $2,156,000 as compared to SCS-4D's $2,121,000.

AREA 4 LEACHATE

The summary of the detailed analysis for Area 4 Leachate is provided below for Alternatives SCL-4B (Hydraulic Containment); SCL-4C (Air Sparging at GMZ Boundary); SCL-4D (Reactive Barrier Wall) and SCL-4E (Air Sparging at Source and GMZ Boundary).

Overall Protection of Human Health and the Environment
All alternatives evaluated for Area 4 Leachate are protective of human health and the environment. However, only SCL-4D stops contaminants entirely (and in an immediate manner) from moving outside the GMZ boundary for Area 4.

Compliance with ARARs
All alternatives comply with ARARs. Alternative SCL-4D complies with ARARS in the shortest amount of time.

Long-term Effectiveness and Permanence
All alternatives require some degree of operation and maintenance. Alternative SCL-4E is the most effective as it addresses contaminants within hot spots.

Reduction of Toxicity, Mobility, or Volume through Treatment
Alternative SCL-4B provides the least reduction in toxicity, mobility and volume of contaminants as opposed to all others. Alternative SCL-4D provides the highest degree of reduction in toxicity, mobility and volume of contaminants, as contaminants are treated while passing through the reactive barrier wall.

Short-term Effectiveness
All alternatives cause limited exposure to subsurface contaminants during construction. Alternative SCL-4D is the most effective in the short term.

Implementation
Alternative SCL-4D is the most difficult to implement due to excavation and dewatering requirements. Alternative SCL-4B is the easiest.

Cost
The total present worth costs for Area 4 Leachate alternatives are as follows: SCL-4B ($1,117,000); SCL-4C ($2,522,000); SCL-4D ($5,911,000); SCL-4E ($2,796,000).

AREA 7 SOIL

In addition to the No Action Alternative, Alternative SCS-7B will not be discussed within this section because it failed to meet either threshold criterion. The summary of the detailed analysis for Area 7 Soil is provided below for Alternatives SCS-7C (Excavation and Biological Treatment); SCS-7D (Excavation and On-site Low Temperature Thermal Desorption) and SCS-7E (Soil Vapor Extraction and Air Sparging).

Overall Protection of Human Health and the Environment
All alternatives evaluated for Area 7 Soil are protective of human health and the environment. However, SCS-7C and SCS-7D achieve soil preliminary remediation goals in 2 years or less, as opposed to the 15 to 20 years required for SCS-7E.

Compliance with ARARs
Alternative SCS-7D complies with ARARS immediately upon the completion of excavation. All other alternatives would require additional time to meet ARARs.

Long-term Effectiveness and Permanence
All alternatives provide adequate effectiveness and permanence. Alternative SCS-7E is the least effective and permanent, because contaminants are treated in situ, and therefore rely on operation and maintenance of a SVE system. Alternative SCS-7D is the most permanent, as contaminants would be excavated and thermally destroyed above ground.

Reduction of Toxicity, Mobility, or Volume through Treatment
All alternatives would provide adequate reduction in toxicity, mobility and volume of contaminants. Alternative SCS-4E would provide the least reduction in toxicity, mobility and volume of contaminants (approximately 85%) as opposed to all others. However, after extraction, the thermal treatment unit would provide greater than 95% reduction in contaminant volume within the vapors. Alternative SCS-7D would provide the largest overall reduction in toxicity, mobility and volume of contaminants at greater than 90% effectiveness.

Short-term Effectiveness
Alternatives SCS-7C and SCS-7D are very effective in the short term, as contaminants would be removed through excavation. However, these alternatives also have the highest short-term risks to on-site workers and the community, as VOCs could be released during the excavation.

Implementability
All alternatives would be relatively easy to implement and are technically feasible.

Cost
The total present worth costs for Area 7 Soil alternatives are as follows: SCS-7C ($18,218,000); SCS-7D ($15,209,000) and SCS-7E ($5,624,000).

AREA 7 LEACHATE

A summary of the detailed analysis for Alternatives SCL-7B (Multi-phase Extraction/ Leachate Containment and Treatment) and SCL-7C (Reactive Barrier Wall) is provided below.

Overall Protection of Human Health and the Environment
Both alternatives evaluated for Area 7 Leachate are protective of human health and the environment. However, only SCL-7C, the reactive barrier wall, stops contaminants entirely (and in an immediate manner) from moving outside the GMZ boundary for Area 7.

Compliance with ARARs
Both alternatives comply with ARARs. Alternative SCL-7D complies with ARARS in the shortest amount of time.

Long-term Effectiveness and Permanence
Both alternatives would provide an adequate degree of effectiveness and permanence. Alternative SCL-7B would provide a higher degree of permanence, as the NAPL is addressed directly through extraction.

Reduction of Toxicity, Mobility, or Volume through Treatment
Alternative SCL-7B would provide the greatest reduction in toxicity, mobility and volume of contaminants, as treatment occurs within the hot spots.

Short-term Effectiveness
Alternative SCL-7C is the most effective in the short term, as contaminants would be treated immediately as they pass through the barrier wall.

Implementation
Alternative SCL-7C is the most difficult to implement due to excavation and dewatering requirements to install the wall within the trench.

Cost
The total present worth costs for Area 7 Leachate alternatives are as follows: SCL-7B ($2,637,000) and SCL-7C ($4,391,000).

AREA 9/10 SOIL

In addition to the No Action Alternative, Alternative SCS-9/10B will not be discussed within this section because it failed to meet either threshold criteria. A summary of the detailed analysis for Alternative SCS-9/10C (Soil Vapor Extraction) is provided below.

Overall Protection of Human Health and the Environment
Alternative SCS-9/10C is the only alternative that is protective of human health and the environment.

Compliance with ARARs
Alternative SCS-9/10C would comply with ARARS in a reasonable time frame.

Long-term Effectiveness and Permanence
Alternative SCS-9/10C is the most effective and permanent, although contaminants would be treated in situ, and therefore would rely on operation and maintenance of a SVE system.

Reduction of Toxicity, Mobility, or Volume through Treatment
Alternative SCS-9/10C would provide the greatest reduction in toxicity, mobility and volume of contaminants (approximately 85%) as opposed to all others.

Short-term Effectiveness
Alternative SCS-9/10C would provide a medium level of short-term effectiveness. The SVE system would require a certain amount of time to achieve remediation goals. Short-term risks to on-site workers and the community would be minimal, as soils would be treated in situ.

Implementation
Soil Vapor Extraction under SCS-9/10C would be relatively easy to implement, however, space considerations exist.

Cost
The total present worth costs for Alternative SCS-9/10C is $4,308,000.

AREA 9/10 LEACHATE

A summary of the detailed analysis for Area 9/10 Leachate is provided below for Alternatives SCL-9/10B (Hydraulic Containment); SCL-9/10C (Air Sparging at GMZ Boundary); SCL-9/10D (Reactive Barrier Wall) and SCL-9/10E (Air Sparging at Source and GMZ Boundary).

Overall Protection of Human Health and the Environment
All alternatives evaluated for Area 9/10 Leachate are protective of human health and the environment. However, SCL-9/10E would remediate the contamination to a level where natural attenuation will allow ARARs to be met outside the GMZ boundary for Area 9/10.

Compliance with ARARs
All alternatives comply with ARARs. Alternative SCS-9/10E complies with ARARS in an appropriate time frame.

Long-term Effectiveness and Permanence
All alternatives require some degree of operation and maintenance. Alternative SCL-9/10E best meets this criterion, as the degree of residual risk after remediation objectives are achieved would be small. This is because SCL-9/10E would address contaminants within hot spots.

Reduction of Toxicity, Mobility, or Volume through Treatment
Alternative SCL-9/10E would provide enough reduction in toxicity, mobility and volume of contaminants to allow ARARS to be met in the time frame set forth in this ROD.

Short-term Effectiveness
All alternatives cause limited exposure to subsurface contaminants during construction. Alternative SCL-9/10E is effective in the short term.

Implementation
Alternative SCL-9/10E is difficult to implement due to excavation and dewatering requirements. Alternatives SCL-9/10C, SCL-9/10D and SCL-9/10E all face some difficulty, due to construction beneath 9th Street. Alternative SCL-9/10B would be the easiest to implement.

Cost
The total present worth costs for Area 9/10 Leachate alternatives are as follows: SCL-9/10B ($2,440,000); SCL-9/10C ($3,208,000); SCL-9/10D ($3,523,000) and SCL-9/10E ($3,619,000).

The Contingent Remedy for Leachate Area 9/10 is SCL-9/10B (Hydraulic Containment/Leachate Containment/Collection and Treatment by Air Stripping). SCL-9/10B by itself is a limited action that meets necessary requirements for overall protection of human health and the environment. However, this alternative would not meet ARARS as quickly as SCL-9/10E enhanced air sparging so it was not selected for the preferred remedy. This alternative, while providing some protection to down-gradient receptors, by itself would comply with ARARs at the property boundary. However, as a contingent remedy used if necessary in conjunction to SCL-9/10E to address NAPL or higher concentrations of contaminated leachate it will assist in the meeting of ARARs through source reduction in the proposed time frames.

Overall Protection of Human Health and the Environment
All alternatives evaluated for Area 9/10 Leachate are protective of human health and the environment. However, SCL-9/10B would remediate the contamination to a level where natural attenuation will allow ARARs to be met outside the GMZ boundary for Area 9/10.

Compliance with ARARs
All alternatives comply with ARARs. Alternative SCS-9/10B complies with ARARS in an appropriate time frame it is not as effective as the preferred remedy of SCL-9/10E. Therefore it is proposed only as a contingent remedy to the proposed leachate remedy.

Long-term Effectiveness and Permanence
All alternatives require some degree of operation and maintenance. Alternative SCL-9/10B meets this criterion, as the degree of residual risk after remediation objectives are achieved would be small. This is because SCL-9/10B would address contaminants within hot spots.

Reduction of Toxicity, Mobility, or Volume through Treatment
Alternative SCL-9/10B would provide sufficient reduction in toxicity, mobility and volume of contaminants to allow ARARS to be met at the designated GMZ boundaries in the time frame set forth in this ROD.

Short-term Effectiveness
All alternatives cause limited exposure to subsurface contaminants during construction. Alternative SCL-9/10B is effective in the short term at the property boundaries where it would be implemented, but not as effective in contaminant control down-gradient from the source area. The proposed remedy SCL-9/10E is considerably more effective and SCL-9/10B would be designed to supplement and assist SCL-9/10E if construction is necessary.

Implementation
Alternative SCL-9/10B would be the easiest to implement, however would face some problems from the placement of the extraction wells and utilities. Alternatives SCL-9/10C, SCL-9/10D and SCL-9/10E all face some difficulty, due to construction beneath 9th Street.

Cost
The total present worth costs for Area 9/10 Leachate alternatives are as follows: SCL-9/10B ($2,440,000); SCL-9/10C ($3,208,000); SCL-9/10D ($3,523,000) and SCL-9/10E ($3,619,000).

AREA 11 SOIL

In addition to the No Action Alternative, Alternative SCS-11B will not be discussed within this section because it failed to meet either threshold criteria. The summary of the detailed analysis for Area 11 Soil is provided below for Alternative SCS-11C (Soil Vapor Extraction).

Overall Protection of Human Health and the Environment
Alternative SCS-11C is the only alternative that is protective of human health and the environment.

Compliance with ARARs
Alternative SCS-11C would comply with ARARS in a reasonable time frame.

Long-term Effectiveness and Permanence
Alternative SCS-11C is the most effective and permanent, although contaminants are treated in situ and therefore rely on operation and maintenance of a SVE system.

Reduction of Toxicity, Mobility, or Volume through Treatment
Alternative SCS-11C provides the greatest reduction in toxicity, mobility and volume of contaminants (approximately 85%) as opposed to all others.

Short-term Effectiveness
Alternative SCS-11C provides a medium level of short-term effectiveness. The SVE system will require a certain amount of time to achieve remediation goals. Short-term risks to on-site workers and the community are minimal, as soils would be treated in situ.

Implementability
Soil Vapor Extraction under SCS-11C is relatively easy to implement, however, space considerations exist.

Cost
The total present worth costs for Alternative SCS-11C is $3,185,500.

AREA 11 LEACHATE

The summary of the detailed analysis for Area 11 Leachate is provided below for Alternative SCL-11A (No Action)

Overall Protection of Human Health and the Environment
The No Action alternative is protective of human health and the environment.

Compliance with ARARs
Alternative SCL-11A complies with ARARs.

Long-term Effectiveness and Permanence
Alternative SCL-11A requires a degree of operation and maintenance as on-going groundwater sampling will be required. Alternative SCL-11A meets this criterion. Groundwater contamination will continue to degrade naturally.

Reduction of Toxicity, Mobility, or Volume through Treatment
Alternative SCL-11A will reduce toxicity, mobility and volume of contaminants through natural degradation.

Short-term Effectiveness
Alternative SCL-11A is effective in the short term. Low-level exposure to subsurface contamination may occur during installation of monitoring wells and sampling events.

Implementation
Alternative SCL-11A is straightforward to implement.

Cost
The total present worth costs for Alternative SCL-11A is $297,000.

PRINCIPAL THREAT WASTES

The National Contingency Plan (NCP) establishes an expectation that U.S. EPA will use treatment to address principal threats posed by a site wherever practicable (NCP, 40 CFR §300.430(a)(1)(iii)(A)). The term "principal threat" refers to source materials that are considered to be highly toxic or highly mobile that generally cannot be reliably contained or would present a significant risk to human health or the environment should exposure occur (U.S. EPA, Guide 6-40). Remedial investigations conducted at the site have identified principal threat wastes at all four source areas (Area 4, Area 7, Area 9/10 and Area 11). Residual NAPL was positively identified at Areas 4, 7 and 11 (CDM, 2000 RI). At Area 9/10, groundwater concentrations were identified that were indicative of a significant source of groundwater contamination and NAPL presence (CDM, 2000 RI 3-77). The following text summarizes information identifying the principal threats at each Source Area.

AREA 4

Soil boring SB4-202 taken in the northern part of Swebco's parking lot tested positive for the presence of a LNAPL directly above and within the top portion of the saturated zone (CDM, 2000 RI 3-14). Laboratory analysis of soil within boring SB4-202 contained 510 ppm of 1,1,1-TCA (CDM, 2000 RI 3-14). LNAPL was found present at the source from 27 to 35 feet bgs but was not found in deeper portions of SB4-202 (CDM, 2000 RI 3-14). The extent of NAPL contamination was not identified. The estimated volume of contaminated soil at Area 4 is 155,400 cubic feet (CDM Operable Unit Three FS Appendix C).

AREA 7

Subsurface sampling results obtained at Area 7 suggest the presence of NAPL in two hot spots located in the northern and southern portions of the area. In the southern hot spot, PCE concentrations of 260 ppm in soil sample SB7-8D suggest the presence of a NAPL (CDM, 1995 RI 4-48). Concentrations of VOCs such as xylene, naphthalene and 2-methyl naphthalene were also identified within soil boring SB7-8 at concentrations high enough to exist as NAPL (CDM, 1995 RI 4-48). Additionally, the SB7-8D soil-boring log indicates an elevated headspace and a strong solvent odor for sample SB7-8D (CDM, 1995 RI Appendix A). Specific tests designed to positively identify NAPL were not performed on soils in the southern hot spot.

AREA 9/10

The concentration of 12 ppm of 1,1,1-TCA in MW201 indicates that NAPL is likely present in Area 9/10, based on the aqueous solubility limit of 1,1,1-TCA. The concentration of 1,1,1-TCA in MW201 represents 0.8 to 4 percent of its aqueous solubility limit. Dye testing did not reveal the presence of NAPL in the more shallow portions of the unconsolidated aquifer. However, DNAPL would not be expected to be present in the more shallow portions of the aquifer, because no confining units are present in the top 100 feet of the aquifer (CDM, 2000 RI 3-77).

Further research has revealed that numerous releases of petroleum based fuels (JP4, mineral spirits and fuel oil) and chlorinated solvents have occurred from underground storage tanks (USTs) in Area 9/10. Reports submitted to the Illinois EPA reveal that LNAPL in relation to the above- mentioned releases exists or has existed floating on the water table. In addition, PCE, TCE and metals are present in soil at concentrations that would be considered a threat to contaminate groundwater above the Class I Groundwater Standards.

AREA 11

Subsurface sampling results obtained at Area 11 suggest the presence of NAPL in two hot spots located in the western and central portions of the area. NAPL was detected in the western zone during field screening of SB11-203 soil samples from 39 to 43 feet bgs. A combination of black staining of soils and Sudan IV dye testing confirmed the presence of NAPL in samples taken from 39 to 43 feet bgs. Similar conditions were identified in SB11-202 from 39 to 45 feet bgs (CDM, 2000 RI 3-45, 51).

Soil samples taken in the central zone of contamination, SB11-4G (total VOCs 307 ppm) and SB11-8G (total VOCs 42 ppm) indicate the possibility for NAPL (CDM, 1995 RI 4-70, Table 4-4). However, no staining is noted in the soil boring logs and the Sudan IV dye test was not performed during the Operable Unit 2 investigation. The extent of NAPL contamination was not identified. The total estimated volume of soil at Area 11 is approximately 237,084 cubic feet (CDM, 2000 FS Appendix E).

SELECTED REMEDY

This section describes the rationale and the preferred alternatives for each source area and provides Illinois EPA's reasoning behind its selection. Alternatives can change or be modified if new information is made available to Illinois EPA through further investigation or research. An appropriate range of alternatives was developed, based upon the initial screening of technologies, the potential for contaminants to impact the environment and specific criteria for the source areas.

SOIL SOURCE CONTROL

The U.S. EPA has developed presumptive remedy directives with the objectives of streamlining site investigations and facilitating the selection of remedial actions. The directive on presumptive remedies for soils contaminated by VOCs is appropriate for addressing the types of contaminants found in the source areas at the Southeast Rockford site. Presumptive remedies that were considered and would be implemented for this site include soil vapor extraction and thermal desorption. Ex situ bioremediation was also considered for Area 7 as an alternative to thermal desorption of excavated material. For this source area, ex situ bioremediation would require a longer timeframe than soil vapor extraction to achieve ARARs. However, ex situ bioremediation would be more advantageous than ex situ soil vapor extraction, since bioremediation would not require treatment of contaminants in the vapor stream

LEACHATE SOURCE CONTROL

To assemble alternatives, general response actions were combined to form complete remedial responses for the media of concern in each source area. A detailed remedial approach considered the specific extent, depth and mobility of contaminants, as well as site-specific area constraints and hydrogeology for the individual source areas. Leachate source control would address residual contamination not addressed by soil remediation alternatives (other than No Action).

Leachate source control includes contaminated leachate in the shallow water-bearing zone. Leachate is assumed to be contamination that originated from the soil source areas and has migrated to the unconsolidated aquifer within the designated source areas. Contaminated source leachate is defined in the FFS and hereafter as shallow groundwater located inside each source area. Groundwater located outside the potential GMZ of the source areas was evaluated as part of management of migration of site-wide groundwater, and is not addressed as part of the FFS.

Leachate source control alternatives were formulated to address the remediation for each source area. Leachate source control alternatives were developed for Source Areas 4, 7 and 9/10, as noted in the fate and transport analysis (Final RI, SCOU 7/25/2000). Source Area 11 does not require leachate source control, based on modeling results that indicate ARARs are attained at the GMZ boundary.

GROUNDWATER MANAGEMENT ZONES (GMZ)

Fact Sheets and the proposed plan presented by the Illinois EPA proposed the use of Groundwater Management Zones pursuant to 35 Ill. Adm. Code 620.250 for each source area. As defined by Illinois EPA regulations, "a GMZ may be established as a three dimensional region containing groundwater being managed to mitigate impairment caused by the release of contaminants from a site". Groundwater Management Zones are used and established for sites undergoing corrective action that is approved by the Illinois EPA. The Focused Feasibility Study prepared for the Illinois EPA by Camp Dresser & McKee dated September 5, 2000 Volume I, Section 3-1, figures 3-1 through 3-4, presents boundaries of the proposed GMZ for each source area. For source areas 4, 7, and 11, the GMZ boundary was set to areas surrounding contaminated soil. In addition, the GMZ boundaries were set where it was possible for the proposed remedial action to achieve ARARs. The GMZ boundary for Source Area 9/10 was established knowing that site characterization of soil contamination was incomplete. Therefore, the GMZ boundary would encompass an area in which the Illinois EPA believes soil contamination is present, including United Technologies Corporation/Hamilton Sundstrand (UTC/HS) Corporation Plant No. 1, former Mid States Industrial and Rockford Products east of Ninth Street.

Volume 1, Section 7.1 of the Focused Feasibility Study, dated September 5, 2000 states, "Groundwater that lies beyond the GMZ of each source is considered part of the site-wide groundwater." During the time needed for remediation of the source areas, groundwater that exceeds the Class I Groundwater Quality Standards will exist below the entire area. As part of the GMZ, its boundaries will act as points of compliance set forth as part of the GMZ. It is the intention of the Illinois EPA that Class I Groundwater Quality Standards be met as part of the remediation goals. However, since it is possible that Class I Groundwater Quality Standards can not be achieved in the time frame established for remediation of the source areas, it may become necessary for the temporary establishment of alternative groundwater standards, pursuant to 35 Ill. Adm. Code Part, 620. This may occur for source areas where contaminated groundwater is flowing from an up-gradient position onto a source area. Therefore, compliance with GMZ requirements can be accomplished by the establishment of background conditions from groundwater located up gradient of the source area that it is migrating below the source area in question. Background concentrations in groundwater shall be established for the Southeast Rockford Groundwater Contamination Site pursuant to 35 Ill. Adm. Code 724, Subpart F and only for those groundwaters found to be significantly over Class I Groundwater Standards.

It is the intention of the proposed remedies in this ROD to meet the desired goals of Class I Groundwater Standards for the source areas, as well as the entire Southeast Rockford Area. However, due to continuing migration of contaminated groundwater below the entire site, exceedences of the Class I Groundwater quality may occur beyond GMZ boundaries until such time that the proposed remedies are fully operational and functional. Part of the proposed remedy is natural attenuation of already-contaminated groundwater beyond the source areas, however, to achieve this, adjustments shall be made for compliance with Groundwater Quality Standards, in accordance with 35 Ill. Adm. Code Part 620. The Illinois EPA acknowledges that the groundwater will not meet Class I Groundwater Standards until enough natural degradation

of contamination occurs. Natural attenuation is a major part of the remedy proposed for the overall remediation of the entire site. Groundwater monitoring would be carried out during the entire remediation process to assess the effectiveness of the remedies proposed in the ROD. Pursuant to 35 Ill. Adm. Code 620.250(c), "The Agency shall review the on-going adequacy of controls and continued management at the site if concentrations of chemical constituents, as specified in Section 620.250(a)(4)(B), remain in groundwater at the site following completion of such action. The review must take place no less than every five years." This part of Illinois regulations is concurrent with the policies of the CERCLA and the NCP that will allow the Illinois EPA the opportunity to adjust remediation activities to meet the desired remediation goals.

AREA 4

Alternatives SCS-4D (Excavation and On-site Low Temperature Thermal Desorption) and SCL-4B (Hydraulic Containment) are the preferred alternatives for Area 4. The combination of these alternatives achieves substantial risk reduction by removing the source materials that constitute principal threats, as well as removing contaminated soil and groundwater surrounding the source materials. The excavation of contamination and thermal treatment, coupled with leachate containment reduces risks more quickly and cost effectively than the other alternatives.

Under these alternatives, approximately 2,800 cubic yards of contaminated soils would be excavated and VOCs would be removed through on-site thermal treatment via a LTTD unit. Excavated soils would be conveyed to the primary treatment unit, where the contaminants are thermally desorbed from the soil. It would take approximately one month (estimated) to thermally process the soil. Due to the levels of VOCs expected during excavation, the cost to install a temporary enclosure over the excavation (for emissions control) has been included. Contaminated vapors would be collected from the temporary enclosure and directed to the afterburner used in conjunction with the LTTD unit. Vapors produced within the thermal desorption unit would thus be destroyed in the afterburner. The treated soil would then be conveyed to a process unit that cools and re-hydrates the soil. Treated soil would be stockpiled, and following testing to ensure that remediation goals have been achieved, would be placed back into the excavation.

Well points would be installed to lower the water table and thus expose the residual NAPL. Water collected during this dewatering process would be contained on site in two 21,000-gallon carbon steel tanks and transported to an appropriate disposal facility (at a frequency to be determined during the design phase).

Following the completion of the soils excavation and thermal treatment, the leachate containment and treatment system would be installed. Leachate would be contained and extracted at a rate of approximately 20 gpm through a series of six leachate extraction wells, submersible pumps, piping and controls. An air-stripping unit would then treat the extracted leachate. The treated effluent would be discharged on site to a storm water ditch. Effluent would be monitored periodically for VOCs to confirm that the leachate is treated to acceptable levels. Vapors

stripped from the leachate in the air-stripping unit would be directed to an on-site GAC unit. It is expected that under these alternatives, Area 4 would meet RAOs in less than 15 years.

Institutional controls would be placed on groundwater usage within the GMZ, monitoring wells would be installed and a groundwater- and leachate-monitoring program would be implemented. The total present worth cost of these alternatives is $3,238,000.

PNAs were identified as COCs in soils at Area 4. PNAs are not directly addressed by SCS-4D, although some remediation may occur incidentally (LTTD is not 100% effective on PNAs). Additional data will be obtained during remedial design to determine if PNAs are truly COCs due to industrial activities at Area 4, or simply contamination from other activities (i.e. naturally occurring sources or non-industrial human activities). If the PNA evaluation conducted during remedial design identifies the need for additional remediation, the remedy would be appropriately altered. Depending on the significance of the change in the remedy, the Agencies may be required to hold additional public meetings and allow public comment on the new remedy.

Proposed alternatives for Area 4 will meet all RAOs for Area 4. Table 10 describes each RAO and how the alternatives would meet them.

Excavation of soils and NAPL followed by LTTD would remove and treat the principal threat wastes from Source Area 4. Based on information currently available, the lead agency believes the Preferred Alternative meets the threshold criteria and provides the best balance of tradeoffs among the other alternatives with respect to the balancing and modifying criteria. The Illinois EPA expects the Preferred Alternative for Area 4 to satisfy the following statutory requirements of CERCLA §.121(b): (1) be protective of human health and the environment; (2) comply with ARARs (or justify waiver); (3) be cost effective; (4) utilize permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable and (5) satisfy the preference for treatment as a principal element, or explain why the preference for treatment will not be met.

Table 10. Area 4 Remedial Action Objectives

Remedial Action Objective -- ***Prevent the public from contact with soil containing contamination in excess of state or federal standards or that poses a threat to human health.***

How Alternative will meet RAO -- Soils containing contamination in excess of state or federal standards or that poses a threat to human health will be excavated and treated by LTTD.

Remedial Action Objective -- ***Prevent the public from inhalation of airborne contaminants in excess of state or federal standards or that pose a threat to human health.***

How Alternative will meet RAO -- Soils containing contamination in excess of state or federal standards or that poses a threat to human health will be excavated and treated by LTTD.

Remedial Action Objective -- ***Prevent the migration of contamination from the source area that would result in degradation of site-wide groundwater or surface water to levels in excess of state or federal standards or that pose a threat to human health or the environment.***

How Alternative will meet RAO -- The removal of free product NAPL, as well as those soils containing contamination in concentrations contributing to groundwater contamination in excess of ARARs will be excavated and treated. Following the LTTD, the leachate containment system will extract remaining leachate contamination until ARARs are met at the GMZ boundary.

AREA 7

Alternatives SCS-7E (Soil Vapor Extraction and Air Sparging) and SCL-7B (Multi-phase Extraction with Leachate Containment and Treatment) are the preferred alternatives for Area 7. These alternatives are recommended because they would achieve substantial risk reduction in consideration of cost. Alternatives SCS-7E and SCL-7B reduce risks substantially by treating the source materials constituting principal threats at the site.

Under these alternatives, the in situ technologies soil vapor extraction, air sparging, and multi-phase extraction would work in concert to treat contaminants in unsaturated and saturated soil and leachate in Source Area 7. The SVE system would extract vapors from suspected hot spots through sixteen vacuum extraction wells. Wells would be constructed to a depth of up to 25 feet and screened in the vadose zone, where they will extract volatile contaminants from the unsaturated zone, as well as some leachate contaminants that are able to volatilize from the surface of the water table. The estimated flow rate for the SVE system is 1200 scfm.

An air sparging system would be constructed to volatilize VOCs from saturated soils and leachate through the injection of air. VOCs would be collected through the SVE system from contaminated soil. A total of 53 air-sparging wells would be constructed to a depth of 50 feet bgs. CDM has assumed a radius of influence of 25 feet for the air sparging wells. Two air compressors would be used to inject air to the subsurface, each at a rate of 400 scfm, for a total of 800 scfm.

A MPE system would focus on the hot spot areas where either highly contaminated soils or NAPL exists. The MPE system would extract a combination of the following phases: NAPLs; groundwater (leachate); and soil vapor. Ten MPE wells would be installed into the hot spots to a depth of approximately 25 feet.

Lastly, a leachate containment system consisting of eight leachate extraction wells, a central pump station, an air-stripping unit, piping and controls would be installed. A containment system would focus on contaminated leachate along the down-gradient side of the GMZ.

Leachate would be collected in the extraction wells and pumped to the air-stripping unit at a rate of 10 gpm.

The SVE, MPE and leachate containment systems would pipe contaminants to a central treatment building in the form of vapors, NAPL and leachate. Vapors would be sent directly to a catalytic oxidation system for treatment. Leachate and NAPL would be separated from each other through an oil/water separator. NAPL that is collected will be sent off site for treatment and leachate will be directed to an on-site air stripper. Vapors from the air stripper containing VOCs stripped from the leachate would be directed to the catalytic oxidation system for treatment. Treated water collected in the central treatment unit would be discharged on site to the unnamed creek located approximately 450 feet north of the hot spots.

Recovered NAPLs, groundwater and soil vapor would be piped underground to a central vacuum pump/vapor treatment system enclosure. The enclosure would also include an air/water separation system, with the separated water pumped to the leachate containment system air stripper. This alternative should comply with RAOs after approximately 15 to 25 years.

Institutional controls would be placed on groundwater usage within the GMZ, monitoring wells would be installed and a groundwater and leachate-monitoring program would be implemented. Estimated total present worth cost for these alternatives is $8,261,000.

Because the Illinois EPA was unable to quantitatively evaluate human health risks to residents who were exposed to creek surface water and sediments in Area 7, additional data from the creek will be obtained during the design phase (likely during 2002). Following data collection, risks to human health will be quantitatively evaluated. However, activities of the current owner have resulted in modification of the flow of the creek. This activity may hinder or potentially eliminate the ability of the Illinois EPA to collect additional samples necessary to perform a complete risk assessment.

Similarly, additional data will be collected from the creek during the design phase of the project to complete the ecological risk assessment. If the additional human health or ecological risk evaluations conducted during design identify the need for remediation in addition to that outlined within this ROD, the remedy will be appropriately altered. Depending on the significance of the change in remedy, the Agencies may be required to hold additional public meetings and allow public comment on the new remedy. The proposed alternatives for Area 7 would meet all RAOs for Area 7. The following table describes each RAO and how the alternatives would meet them.

Table 11. Area 7 Remedial Action Objectives

Remedial Action Objective -- *Prevent the public from contact with soil containing contamination in excess of state or federal standards or that poses a threat to human health.*

How Alternative will meet RAO -- Soil containing contamination in excess of state or federal standards or that poses a threat to human health will be treated by a combination

of SVE and MPE. Increased airflow caused by SVE and MPE will remove contaminants from soils and promote biodegradation.

Remedial Action Objective -- ***Prevent the public from inhalation of airborne contaminants in excess of state or federal standards or that pose a threat to human health.***

How Alternative will meet RAO -- Soil containing contamination in excess of state or federal standards or that poses a threat to human health will be treated by a combination of SVE and MPE. Increased airflow caused by SVE and MPE will remove contaminants from soils and promote biodegradation.

Remedial Action Objective -- ***Prevent the migration of contamination from the source area that would result in degradation of site-wide groundwater or surface water to levels in excess of state or federal standards or that pose a threat to human health or the environment.***

How Alternative will meet RAO -- A combination of SVE, MPE, and air sparging will remove free product and the contamination from soils that contain concentrations contributing to site-wide groundwater contamination in excess of ARARs. Leachate and soil contaminants below the water table will be treated by a combination of air sparging, and leachate containment, which will be achieved by leachate collection via extraction wells. The leachate containment system will extract remaining leachate contamination until ARARs are met at the GMZ boundary.

Remedial Action Objective -- ***Prevent the public from ingestion and direct contact with surface water containing contamination in excess of state or federal standards or that pose a threat to human health.***

How Alternative will meet RAO -- The removal of free product, contaminated soils, and contaminated groundwater will reduce the possibility that Area 7 groundwater contamination might impact the creek north of the park. Additional sampling will determine if levels within the creek pose a threat to human health.

Remedial Action Objective -- ***Prevent the migration of contamination from Source Area 7 that would result in degradation of surface water and sediment in the unnamed creek to levels in excess of state or federal standards or that pose a threat to human health or the environment.***

How Alternative will meet RAO -- The removal of free product, contaminated soils, and contaminated groundwater will reduce the possibility that Area 7 groundwater contamination might impact the creek north of the park. Additional sampling will determine if levels within the creek pose a threat to the environment.

Remedial Action Objective -- ***Prevent the migration of contamination from Source Area 7 that would result in the contamination of home-grown vegetables at concentrations which would pose a threat to human health.***

How Alternative will meet RAO -- The removal of free product, contaminated soils, and contaminated groundwater will reduce the possibility that Area 7 contamination might impact homegrown vegetables and fruits.

Extraction of NAPL and implementation of SVE in combination with air sparging would remove and treat the principal threat wastes from Source Area 7. Based on information currently available, the Illinois EPA believes the Preferred Alternative for Area 7 meets the threshold criteria and provides the best balance of tradeoffs among the other alternatives with respect to the balancing and modifying criteria. The Illinois EPA expects the Preferred Alternative to satisfy the following statutory requirements of CERCLA § 121(b): (1) be protective of human health and the environment; (2) comply with ARARs (or justify waiver); (3) be cost effective; (4) utilize permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable; and (5) satisfy the preference for treatment as a principal element, or explain why the preference for treatment will not be met.

AREA 9/10

Alternatives SCS-9/10C (Soil Vapor Extraction) and SCL-9/10E (Enhanced Air Sparging) are the preferred alternatives for Area 9/10. These alternatives are recommended, because following a more thorough investigation, they would provide substantial risk reduction by treating the source materials constituting principal threats at the site. The combination of SVE and enhanced air sparging would reduce risks in a reasonable amount of time, for a reasonable cost. Enhanced air sparging would take a slightly longer period of time to complete remediation objectives, as opposed to the reactive barrier wall. As part of the design phase in area 9/10, further investigation would be conducted to determine the most efficient means of implementing the remedies selected. To ensure efficiency in placement of the leachate remedy selection (SCL-9/10E) in effective source control, the leachate remedy would be made in conjunction with further investigation of Source Area 9/10. Upon the implementation of the Soil Vapor Extraction (SCS-9/10C and SCL-9/10E), should the results of the investigation indicate that additional corrective action is required, a contingent multi-phase pump and treat remedy (SCL-9/10B) or similarly designed system would be implemented to assist the selected remedy.

The SCL-9/10B was designed for Source Area 9/10 as a limited action response by itself, however, as a contingent remedy it's purpose would be to supplement the proposed leachate remedy (SCL-910E) enhanced air sparging. Implementation of the contingent pump and treat remedy (SCL-9/10B) could be made, pending the results of further characterization and effectiveness of the selective remedy. However, if further site characterization should discover that DNAPLs (free product), or higher (than previously expected) leachate concentrations exist below Source Area 9/10, the contingent remedy should be implemented as soon as possible. Designing a low volume vacuum extraction multi-phase system that would include a pump and treat system at 50 gallons per minute would allow the treatment of DNAPLs contained within the leachate. Should high enough concentrations of NAPL exist it may be necessary to collect the free product separately in a tank and dispose of it separately at a facility qualified and licensed for this type of work. The presence of DNAPLs would indicate that further contamination of the groundwater would occur, for a longer period of time, thus requiring the removal of that source

to meet Class I Groundwater Standards. In addition, another trigger is if groundwater monitoring should reveal that concentrations of contaminants in groundwater are not decreasing after a period of time from operation of the soil remedy SVE. Design and construction of the contingent leachate remedy would be made on analysis of the results from additional characterization. Therefore, implementation of the contingent pump and treat remedy (SCL-9/10B) or a similarly designed system would be necessary based upon proposed further characterization and results of the proposed remedial actions (SCS-9/10C and SCL-9/10F) for source control to meet ARARs in the proposed time frame.

Under these alternatives, contaminated soils would be remediated in situ via an SVE system and leachate would be treated through the use of enhanced air sparging. At least four vacuum-extraction wells will be screened in the vadose zone, where they will remove volatile contaminants from the unsaturated zone, as well as some leachate contaminants that may diffuse from the surface of the water table. Vapors collected from the SVE unit will be treated using granular activated carbon. Following treatment, the vapors will be released to the atmosphere.

A thorough investigation could not be completed at Area 9/10, due to concern over underground utilities. Therefore, additional data will need to be collected in this area prior to constructing and designing the remedy. The vapor treatment scenario may have to be reevaluated, based on the results of additional data collection from Area 9/10 and the results of the SVE pilot program.

Originally, the leachate treatment remedy (SCL-9/10D) involved the construction of a Reactive Barrier Wall down gradient of the groundwater management zone (GMZ). Iron filings placed into a slurry react with contaminated groundwater passing through it, breaking down the VOCs into harmless compounds. However, research and additional information collected during the public comment period for the ROD has led the Illinois EPA to conclude that a different remedy should be used.

The information below led the Illinois EPA to first conduct additional investigations into the effectiveness of the proposed Reactive Barrier Wall. Information obtained from record searches indicated that numerous releases (mostly involving JP4 jet fuel) have occurred in Area 9/10. Research revealed that the iron filings of the barrier wall would not react with JP4 (and other petroleum based fuels), and would allow the JP4 to pass through the wall untreated. In addition, it is possible that the presence of JP4 may actually block the iron filings from reacting with chlorinated solvents (jet fuel could clog and foul the iron filings and thus inhibit the desired chemical reactions).

Further investigation supplied from sites in the Rockford area with similar natural groundwater chemistry indicated that groundwater passing through the barrier wall may very well result in the formation of a skin of calcium carbonate on the face of the reactive wall. This would result in a loss of permeability, leading to contaminated groundwater finding alternative paths through and around the system. Clogging and fouling up of barrier walls is now coming to be seen as a problem as use of barrier walls increases. The formation of mineral precipitates and/or biological fouling would likely result in a reduction of longevity and efficiency of the reactive barrier wall.

Research has shown that other potential contaminants (metals and other petroleum based fuels) exist in concentrations that present a concern to the Illinois EPA. The current design of the barrier wall will not accommodate these types of contaminants. Additional reactive gates would be required to remediate these newly identified contaminants.

Public comment and research conducted by the Illinois EPA led to the conclusion that substantial cost would be incurred to redesign the Reactive Barrier Wall system. A new barrier wall design would require additional reactive walls, gates and materials to remediate different forms of contamination. In addition, an increase in maintenance costs to both the reactive portions of the wall and to any surrounding structures would result.

A comment made to the Illinois EPA (by Rockford Products) during the public comment process stated that placement of reactive barrier wall on their property would constitute a taking of Rockford Products Property. This issue was investigated and brought to the attention of the Department of Legal Counsel of the Illinois EPA and representatives of the Illinois Attorney General's Office. They concluded that placing the Reactive Wall Barrier on Rockford Products Property might very well constitute a taking of Rockford Products property. A takings issue does not automatically preclude usage of a given alternative. However, it adds complicating factors for which access and/or appropriate compensation must be negotiated. The City of Rockford, in a comment to the Illinois EPA, expressed its concern about the utilities (infrastructure) that lie below Kishwaukee Avenue. This is a problem that would need to be addressed during the design phase; the real possibility of increased hydraulic pressure of groundwater may present a problem in dealing with the city utilities. Additional gates from a redesigned barrier wall would require a higher degree of rerouting of city utilities or design problems with the multiple gate system.

It is the decision of the Illinois EPA to select an alternative remedy for the treatment of leachate in Area 9/10 that meets the nine criteria specified by CERCLA. The Illinois EPA has selected alternative SCL-9/10E - Enhanced Air Sparging - as its preferred remedy. Enhanced Air Sparging would involve the placement of air injection wells down gradient and in the more highly- contaminated areas. Air would be injected into the contaminated groundwater, causing the contaminants to volatilize into air pockets in the soil above the water table. The air sparging would have to be operated in conjunction with the Soil Vapor Extraction System SCS-9/10C. Vapors would be collected underground prior to their treatment with activated carbon. Depending upon the further site characterization necessary in Area 9/10, it may be necessary to design a pump and treat system that will collect and remediate DNAPL or LNAPL in conjunction with one of the systems in the proposed plan.

SCL-9/10E: Install Injection Wells Along Boundary of the GMZ and Source Area /Install Air Sparging Unit/Inject Air/Restriction on Groundwater Usage

This alternative includes the installation of air injection wells along the southwestern border of the GMZ and an air-sparging unit. Additional injection wells would be installed into hot spots of contamination (that may include areas where contaminants exist in the form of NAPLs). Air injection into the wells would volatilize VOCs from the leachate that would then be extracted by vacuum extraction. Air sparging would be operated in conjunction with the SVE, with the

vapors being passed through granulated organic carbon and then released into the atmosphere. Capital costs for this method are $2,697,000; annual operation and maintenance $65,000; total cost is $3,619,000.

The original selection of the Reactive Barrier Wall as the preferred remedy was based upon the information available at the time and was made to remediate the entire source area 9/10, not a particular facility. New information obtained by the Illinois EPA warrants the selection of a new remedy, as suggested above, or a possible combination of researched remedies. It is also possible that after further collection of information during the design phase, additions and modifications to the preferred remedy may be required.

Institutional controls would be placed on groundwater usage within the GMZ, monitoring wells would be installed and a groundwater and leachate-monitoring program would be implemented. The estimated present worth cost for these alternatives is $7,831,000.

PNAs were identified as COCs in soils at Area 9/10. PNAs are not addressed by SCS-9/10C. Additional data will be obtained during remedial design to determine if PNAs are truly COCs because of industrial activities at Area 9/10, or simply contamination from other activities (naturally occurring sources or non-industrial human activities).

If the evaluations conducted during design identify the need for remediation in addition to that outlined within this ROD, the remedy would be appropriately altered. Depending on the significance of the change in remedy, the agencies may be required to hold additional public meetings and allow public comment on the new remedy.

The proposed alternatives for Area 9/10 will meet all RAOs for Area 9/10. Table 12 describes each RAO and how the alternatives will meet them.

Table 12. Area 9/10 Remedial Action Objectives

Remedial Action Objective -- ***Prevent the public from contact with soil containing contamination in excess of state or federal standards or that poses a threat to human health.***

How Alternative will meet RAO -- Soil containing contamination in excess of state or federal standards or that poses a threat to human health will be treated by SVE. Increased airflow caused by SVE will remove contaminants from soils and promote biodegradation.

Remedial Action Objective -- ***Prevent the public from inhalation of airborne contaminants in excess of state or federal standards or that pose a threat to human health.***

How Alternative will meet RAO -- Soil containing contamination in excess of state or federal standards or that poses a threat to human health will be treated by SVE. Increased airflow caused by SVE will remove contaminants from soils and promote biodegradation.

Remedial Action Objective -- ***Prevent the migration of contamination from the source area that would result in degradation of site-wide groundwater or surface water to levels in excess of state or federal standards or that pose a threat to human health or the environment.***

How Alternative will meet RAO -- Soil Vapor Extraction will remove free product and the contamination from soils with concentrations contributing to site-wide groundwater contamination in excess of ARARs. Enhanced air sparging may be used to treat leachate to concentrations that meet ARARs at the GMZ boundary.

Following a more thorough investigation, the extraction of NAPL and implementation of SVE in combination with the enhanced air sparging would remove and treat the principal threat wastes from Source Area 9/10. Based on information currently available, the Illinois EPA believes the Preferred Alternative meets the threshold criteria and provides the best balance of tradeoffs among the other alternatives with respect to the balancing and modifying criteria. The Illinois EPA expects the Preferred Alternative to satisfy the following statutory requirements of CERCLA § 121(b): (1) be protective of human health and the environment; (2) comply with ARARs (or justify waiver); (3) be cost effective; (4) utilize permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable; and (5) satisfy the preference for treatment as a principal element, or explain why the preference for treatment will not be met.

SCL-9/10B Contingent Remedy: Hydraulic Containment (leachate monitoring, containment/collection and treatment by air striping, off-site surface discharge, and groundwater use restrictions)

The system is designed as a leachate containment system that would consist of extraction wells and an air-stripping unit. Leachate extracted by pumps would be sent to an air-stripping unit at approximately 50 gallons per minute with the vapors treated with granular activated carbon and the treated vapor being released to the atmosphere. Exact placement of the extraction wells would be designed to treat higher concentrations of contaminated leachate or NAPL as determined from further characterization. In addition the pumping of leachate would also act as a hydraulic control and containment in areas of higher contamination. Treated water from the air-stripping unit would be discharged to off-site storm water ditch. Implementation of this system would be dependent upon the further characterization proposed in this ROD for Source Area 9/10. Design and construction may be tied directly into already proposed remedial design systems SCS-9/10C and SCL-9/10 E thus constructing a multi-phase design system

AREA 11

Alternative SCS-11C (Soil Vapor Extraction) and SCL-11A (No Action) are the preferred alternatives for Area 11. These alternatives are recommended because they would provide substantial risk reduction by treating the source materials constituting principal threats at the site. Alternative SCS-11C would reduce risks in the shortest amount of time for a reasonable cost.

Under these alternatives, contaminated soils would be remediated in situ via a vapor extraction system. Five vacuum extraction wells would be installed in locations of the hot spots in the area. Wells would be screened in the vadose zone, where they would remove volatile contaminants from the unsaturated zone, as well as some leachate contaminants that may diffuse from the surface of the water table. Due to the presence of NAPL, it has been assumed that the wells would be constructed of carbon steel, in case steam injection is required. Given the presence of residual NAPL, it is expected that significant quantities of contaminated vapors will be extracted. The vapors will be treated with a catalytic oxidation unit.

The No Action Alternative has been selected for leachate. Institutional controls would be placed on groundwater usage in the GMZ, approximately four additional monitoring wells would be installed and a groundwater- and leachate-monitoring program would be implemented.

If analysis indicates that contaminants are not degrading to levels near MCLs or risk based corrective action levels, air sparging will be considered in addition to SVE. Air sparging has the added benefit of enhancing biodegradation in both groundwater and vadose zone soils and will address the concerns and RAOs for Area 11. The approximate additional present worth costs for an air-sparging unit at area 11 would be $1,003,000. These costs are not included in the current cost estimate for the preferred Area 11 alternatives.

PNAs identified as COCs in soils at Area 11 are not addressed by SCS-11C. Additional data will be obtained during remedial design to determine if PNAs are truly COCs because of industrial activities at Area 11, or simply contamination from other activities (naturally occurring sources or non-industrial human activities). If the PNA evaluation conducted during design identifies the need for remediation in addition to that outlined within this ROD, the remedy would be appropriately altered. Depending on the significance of the change in remedy, the agencies may be required to hold additional public meetings and allow public comment on the new remedy.

The estimated total present worth cost for the Area 11 alternative is $3,482,500. The proposed alternative for Area 11 will meet all RAOs for Area 11. Table 13 describes the RAOs and how the Alternative will meet them.

Table 13. Area 11 Remedial Action Objectives

Remedial Action Objective -- *Prevent the public from contact with soil containing contamination in excess of state or federal standards or that poses a threat to human health.*

How Alternative will meet RAO -- Soil containing contamination in excess of state or federal standards or that poses a threat to human health will be treated by SVE. Increased airflow caused by SVE will remove contaminants from soils and promote biodegradation.

Remedial Action Objective -- *Prevent the public from inhalation of airborne contaminants in excess of state or federal standards or that pose a threat to human health.*

How Alternative will meet RAO -- Soil containing contamination in excess of state or federal standards or that poses a threat to human health will be treated by SVE. Increased airflow caused by SVE will remove contaminants from soils and promote biodegradation.

Remedial Action Objective -- ***Prevent the migration of contamination from the source area that would result in degradation of site-wide groundwater or surface water to levels in excess of state or federal standards or that pose a threat to human health or the environment.***

How Alternative will meet RAO -- SVE will remove free product and the contamination from soils with concentrations contributing to site-wide groundwater contamination in excess of ARARs. Computer modeling coupled with groundwater analysis will ensure that groundwater contamination will biodegrade at rates such that Area 11 leachate will not result in degradation of site-wide groundwater.

Soil Vapor Extraction would promote the continued natural attenuation of the principal threat wastes and treat the surrounding materials. Based on information currently available, the lead agency believes the Preferred Alternative meets the threshold criteria and provides the best balance of tradeoffs among the other alternatives with respect to the balancing and modifying criteria. The Illinois EPA expects the Preferred Alternative to satisfy the following statutory requirements of CERCLA § 121(b): (1) be protective of human health and the environment; (2) comply with ARARs (or justify waiver); (3) be cost effective; (4) utilize permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable; and (5) satisfy the preference for treatment as a principal element, or explain why the preference for treatment will not be met.

COST ESTIMATE

Table 14

SOUTHEAST ROCKFORD SOURCE CONTROL OPERABLE UNIT AREA 4
ALTERNATIVE SCS-4D REVISED 2: TOTAL DEMOLITION, EXCAVATION, AND ON-SITE THERMAL TREATMENT DETAILED COST ESTIMATE - COMMENTS

COST COMPONENT	COMMENTS
General	
construction trailer (rental and delivery)	50'x12' construction trailer - $1.65/mi delivery fee (100mi) - rental allowance per 1996 Means
Mobilization	Heavy equipment and trailers, per vendor estimate
Demobilization	Allowance for trailer and equipment demobilization
decon trailer	Allowance based on CDM equipment rates
vehicle decon station	20'x20' gravel pad over 11 mil plastic with plywood and joist deck per 1996 Means
vehicle decon equipment	Steam cleaning and water tank per 1996 Means
health and safety equipment	Allowance based on CDM equipment rates
electrical power service supply	Based on expected electrical costs per month for this alternative
dust control	Water truck per 1996 Means
Demolition	
Total Demolition	Building Demolition, large urban projects, mixture of material types per Means 1999
Excavation and On-Site Thermal Treatment	
mobilization/demobilization	Transportation of the Indirect Heat and Volatilization unit (IHV), front loader, and the time involved for set-up for set up and tear down (vendor estimate)
pad for staging	Pad size approx. 200'x200' crushed stone or asphalt (vendor estimate)
temporary enclosure (rental - 88' wide by 200' long)	Sprung Instant Structure - vendor estimate; construct/install. costs include labor and heavy equip.
Excavation	Excavation cost (vendor estimate)
soil treatment	Vendor Estimate for Direct Fired Low Temperature Thermal Desorption (includes providing a loader and loader and operator to place contaminated soil into the cold feed bin and for restockpiling the clean processed reprocessed soil);
backfill and compaction	Backfill and compaction of clean soil from stockpiling (vendor estimate)
water supply	10 GPM is needed for operation of the thermal treatment system (4,800 gpd if run for 8hrs/day), based on costs based on construction site water average per 1996 Means - typical
sheet piling	Steel sheets, approx. 4' x 40' around perimeter of excavation; as per CDM experience
Excavation Dewatering (well point system)	
Completely furnish, install, operate, and remove system: well points spaced 20' O.C.	Based on vendor estimate - More Trench American (June 1998); System operation 24 hours/day, 7 days/week with diesel pumps.
Analytical	Based on CDM Experience
T&D cost (15 GPM produced)	Based on CDM Experience
rental of (2) 21,000 gallon tanks	Based on CDM Experience
Post Treatment Sampling	
Analytical for Volatile Organic Compounds (soils)	Based on 1998 sample analysis costs from Midwest laboratories; samples collected on a grid of 1 grid of 1 sample/250cy; 1 sampling grid per month (including QA/QC samples)
shipping and handling	Costs associated with transporting samples from site to laboratory twice per month

In general, a bulk density of 1.5 tons/yd^3 was assumed for soils material - this conversion was used for conversion of pricing given per ton, where volume of material is given in cubic yards.

Table 15

SOUTHEAST ROCKFORD SOURCE CONTROL OPERABLE UNIT - AREA 4
ALTERNATIVE SCS-4D REVISED 1: PARTIAL DEMOLITION, EXCAVATION, AND ON-SITE THERMAL TREATMENT DETAILED COST ESTIMATE

COST COMPONENT	Unit	No. Units	Unit Cost	Capital Cost	Construction/ Installation Costs	Annual O&M Costs	Start-up & Baseline Costs
General				**$51,785**	**$0**	**$0**	**0**
construction trailer (rental and delivery)	Mo	3	$275	$825			
Mobilization	ls	1	$10,000	$10,000			
Demobilization	ls	1	$10,000	$10,000			
decon trailer	Ea	1	$5,000	$5,000			
vehicle decon station	Ea	1	$10,000	$10,000			
vehicle decon equipment	Ea	1	$570	$570			
health and safety equipment	Mo	3	$4,500	$13,500			
electrical power service supply	Mo	3	$400	$1,200			
dust control	Mo	3	$230	$690			
Demolition				**$7,500**		**$0**	**$0**
Partial Demolition	Cf	30,000	$0.25	$7,500			
Excavation [illegible] Thermal Treatment				**$638,240**	**$60,000**	**$0**	**$0**
mobilization/demobilization	Ls	1	$23,500	$23,500			
pad for staging	Ls	1	$10,000	$10,000			
temporary enclosure (rental - 88' wide by 200' long)	Mo	3	$9,563	$28,689	$60,000		
Excavation	Ton	12,579	$5.00	$62,895			
soil treatment	Ton	4,080	$53.00	$216,240			
backfill and compaction	Ton	12,579	$2.00	$25,158			
water supply (10 GPM)	Mo	3	$1,500	$4,500			
sheet piling	Lf	360	$800	$288,000			
Excavation Dewatering (well point system)				**$281,580**	**$250,000**	**$0**	**$0**
Completely furnish, install, operate, and remove system: well points spaced 20' O.C.	Mo	1	$250,000		$250,000		
analytical	Batch	52	$1,000	$52,000			
T&D cost (15 GPM produced)	Gallon	1,132,900	$0.20	$226,580			
rental of (2) 21,000 gallon tanks	Mo	3	$1,000	$3,000			
Post Treatment Sampling				**$11,800**	**$0**	**$0**	**$0**
Analytical for Volatile Organic Compounds (soils)	Ea	58	$200	$11,600			
shipping and handling	Ea	4	$50	$200			

Table 16

SOUTHEAST ROCKFORD SOURCE CONTROL OPERABLE UNIT
ROCKFORD, ILLINOIS
FEASIBILITY STUDY

SOURCE AREA 4
ALTERNATIVE SCS-4D REVISED 1: PARTIAL DEMOLITION, EXCAVATION, AND ON-SITE THERMAL TREATMENT

Item/Description		Total Cost
CAPITAL COSTS		
	General	$52,000
	Demolition/ Construction	$99,000
	Excavation / On-Site Thermal Treatment	$719,000
	Excavation Dewatering	$532,000
	Post Treatment Sampling	$12,000
	SUBTOTAL CONSTRUCTION COSTS [1]	**$1,414,000**
	Bid Contingency (15%)	$212,000
	Scope Contingency (15%)	$212,000
	Engineering and Design (15%)	$212,000
	Oversight/Health and Safety (5%)	$71,000
	TOTAL CAPITAL COSTS	**$2,121,000**
ANNUAL OPERATING AND MAINTENANCE COSTS		
	General Maintenance of Thermal Treatment System	$0
	TOTAL ANNUAL COSTS	**$0**
REPLACEMENT COSTS		
	TOTAL REPLACEMENT COSTS [2]	**$0**
PRESENT WORTH ANALYSIS		
	Total Capital Costs (from above) [3]	$2,121,000
	Present Worth Annual O&M Costs [4]	$0
	Present Worth Replacement Costs	$0
	TOTAL PRESENT WORTH	**$2,121,000**

(1) Capital costs for construction items do not include oversight fees, which are accounted for separately.
(2) Replacement costs include construction and oversight capital costs.
(3) Capital costs represent the present worth of the given alternative.
(4) Present worth of annual O&M costs is based on a 7% annual discount rate over a project life of 3 months.

Table 17

SOUTHEAST ROCKFORD SOURCE CONTROL OPERABLE UNIT
FOCUSED FEASIBILITY STUDY
ROCKFORD, ILLINOIS
AREA 4 - LEACHATE

ALTERNATIVE SCL-4B: LIMITED ACTION / LEACHATE MONITORING / LEACHATE COLLECTION AND TREATMENT BY AIR STRIPPING UNIT / OFF-SITE SURFACE WATER DISCHARGE / GROUNDWATER USE RESTRICTIONS
COST SUMMARY

Item/Description	Total Cost
CAPITAL COSTS	
Groundwater Use Restrictions	$25,000
Leachate Containment System	$118,000
Leachate Monitoring Wells	$18,000
SUBTOTAL CONSTRUCTION COSTS [1]	**$161,000**
Bid Contingency (15%)	$24,000
Scope Contingency (20%)	$32,000
Engineering and Design (15%)	$24,000
Oversight/Health and Safety (5%)	$8,000
TOTAL CAPITAL COSTS	**$249,000**
ANNUAL OPERATING AND MAINTENANCE COSTS	
Leachate Containment System	$7,000
Granular Activated Carbon	$31,000
Leachate Containment System Sampling and Analysis (per event)	$4,000
Leachate Sampling and Analysis (per event)	$5,000
TOTAL ANNUAL COSTS	**$47,000**
REPLACEMENT COSTS [2]	
Leachate Containment System (every 15 years)	$78,000
Monitoring Well Replacement (every 15 years)	$29,000
TOTAL REPLACEMENT COSTS	**$107,000**
PRESENT WORTH ANALYSIS	
Total Capital Costs (from above) [3]	$249,000
Present Worth Annual O&M Costs [4]	$472,000
Leachate Containment System	
Quarterly Sampling – years 1 through 30	$200,000
Leachate Monitoring Wells	
Quarterly Sampling - years 1 and 2	$37,000
Semi-annual Sampling - years 3 through 30	$106,000
Present Worth Replacement Costs [5]	$53,000
TOTAL PRESENT WORTH	**$1,117,000**

(1) Capital costs for construction items do not include oversight fees.
(2) Replacement costs include construction *and* oversight capital costs.
(3) Capital costs represent the present worth of the given alternative.
30-year projection (Based on RCRA Closure Guidelines).
monitoring wells replacement and leachate collection system (including extraction wells, piping, pumps, and air stripping unit) every 15 years.

Table 18

SOUTHEAST ROCKFORD SOURCE CONTROL OPERABLE UNIT, AREA 7 – ALTERNATIVE SCL-7E: SOIL VAPOR EXTRACTION (SVE)/AIR SPARGING (AS) ALONG GMZ BOUNDARY AND SOURCE AREA / MONITORING / GROUNDWATER USE RESTRICTIONS DETAILED COST ESTIMATE COMMENTS

COST COMPONENT	COMMENTS
Groundwater Use Restrictions	
legal fees	Cost based on CDM experience
General	
construction trailer (rental and delivery)	50'x12' construction trailer. $1.65/mi delivery fee (100mi), rental allowance per 1996 Means
Mobilization	Heavy equipment and trailers, per vendor estimate
Demobilization	Allowance for trailer and equipment demobilization
decon facilities	Based on level of personal and vehicle decontamination anticipated for this alternative
health and safety equipment	Allowance based on CDM equipment rates
electrical power service connection	Based on CDM experience
electrical power service supply	Based on expected electrical costs per month for this alternative
water supply	Based on expected use per month for this alternative (e.g., decon, personnel use)
Monitoring Wells	
Leachate monitoring well installation and materials	Cost based on CDM experience in monitoring well installation
Performance monitoring well installation and materials	Cost based on CDM experience in monitoring well installation
Leachate and Containment System Sampling and Analysis	
Labor	Based on 10 hour work day at average CDM labor rate of $60 for oversight personnel
Vehicle	Based on $300/week rental fee for a field vehicle
Equipment	Based on CDM equipment rental rates
Miscellaneous	Incidental expenses (minor repairs, replacement of equipment, local purchases, etc)
leachate laboratory analysis	Based on average cost incurred for VOC analysis; One duplicate and one blank will be collected per 10 samples.
Vapor Recovery System (VRS)	
VRS well installation	Cost associated with installation of SVE wells. Based on CDM experience.
VRS main system	Vendor: includes blower, exp motor, inline air filter, silencers, dilution valve, moisture separator, condensate transfer pump, high condense. level alarm, vac. relief valve, vac. gauge skid mounting, interconnecting piping and man. motor start switch
VRS control panels	Vendor estimate - NEEP (May 1998)
6" carbon steel pipe	Based on CDM experience
4" carbon steel pipe	Based on CDM experience
Excavation for piping placement (4 foot depth)	12" wide trench and backfill, 48" deep as per 2000 Means
electrical power requirements (10 HP)	Based on 3-phase power, working 24 hrs/day, $0.09/kW-hr
VRS treatment building	Basic prefabricated building on concrete pad. Based on CDM experience.
air/water separator tank	Based on CDM experience
air/water separator tank - condensate disposal	Based on CDM experience
catalytic oxidation	Based on CDM experience
Natural Gas	Based on CDM experience

Table 18 Continued

SOUTHEAST ROCKFORD SOURCE CONTROL OPERABLE UNIT, AREA 7 – ALTERNATIVE SCL-7E: SOIL VAPOR EXTRACTION (SVE)/AIR SPARGING (AS) ALONG GMZ BOUNDARY AND SOURCE AREA / MONITORING / GROUNDWATER USE RESTRICTIONS DETAILED COST ESTIMATE COMMENTS

COST COMPONENT	COMMENTS
Air Sparging (AS)	
AS well installation	Cost associated with installation of AS wells. Based on CDM experience.
AS main system	Vendor: includes blower, exp motor, inline silencer, pressure relief valve, unitized base, pressure gauge and a manual motor starting switch.
AS control panels	Vendor estimate
6" carbon steel piping	Based on CDM experience
4" carbon steel piping	Based on CDM experience
excavation for piping placement	12" wide trench and backfill, 48" deep as per 2000 Means
condensate disposal	Based on CDM experience
electrical power requirements (25 HP)	Based on 3-phase power, working 24 hrs/day, $0.09/kW-hr
AS treatment building	Costs for AS treatment building included with corresponding VRS
air/water separator tan	Costs for air/water separator tank included with corresponding VRS
Catalytic oxidation treatment	Costs for catalytic oxidation treatment included with corresponding VRS

Table 19

SOUTHEAST ROCKFORD SOURCE CONTROL OPERABLE UNIT, AREA 7 ALTERNATIVE SCL-7E: SOIL VAPOR EXTRACTION (SVE)/AIR SPARGING (AS) ALONG GMZ BOUNDARY AND SOURCE AREA / MONITORING / GROUNDWATER USE RESTRICTIONS DETAILED COST ESTIMATE COMMENTS

COST COMPONENT	COMMENTS
Groundwater Use Restrictions	
legal fees	Cost based on CDM experience
General	
construction trailer (rental and delivery)	50'x12' const. trailer, $1.65/mi delivery fee (100mi), rental allowance per 1996 Means
Mobilization	Heavy equipment and trailers, per vendor estimate
Demobilization	Allowance for trailer and equipment demobilization
decon facilities	Based on level of personal and vehicle decontamination anticipated for this alternative
health and safety equipment	Allowance based on CDM equipment rates
electrical power service connection	Based on CDM experience
electrical power service supply	Based on expected electrical costs per month for this alternative
water supply	Based on expected use per month for this alternative (e.g., decon, personnel use)
Monitoring Wells	
Leachate monitoring well install.& materials	Cost based on CDM experience in monitoring well installation
Performance monitoring well install. & matl.	Cost based on CDM experience in monitoring well installation
Leachate and Containment System Sampling and Analysis	
Labor	Based on 10 hour work day at average CDM labor rate of $60 for oversight personnel
Vehicle	Based on $300/week rental fee for a field vehicle
Equipment	Based on CDM equipment rental rates
Miscellaneous	Incidental expenses (minor repairs, replacement of equipment, local purchases, etc)
leachate laboratory analysis	Based on average cost incurred for VOC analysis; One duplicate and one blank will be collected per 10 samples.
Vapor Recovery System (VRS)	
VRS well installation	Cost associated with installation of SVE wells. Based on CDM experience.
VRS main system	Vendor: includes blower, exp motor, inline air filter, silencers, dilution valve, moisture separator, condensate transfer pump, high condense. level alarm, vac. relief valve, vac. gauges, skid mounting, interconnecting piping and a manual motor start switch
VRS control panels	Vendor estimate - NEEP (May 1998)
6" carbon steel pipe	Based on CDM experience
4" carbon steel pipe	Based on CDM experience
Excavation-piping placement (4 foot depth)	12" wide trench and backfill, 48" deep as per 2000 Means
electrical power requirements (10 HP)	Based on 3-phase power, working 24 hrs/day, $0.09/kW-hr
VRS treatment building	Basic prefabricated building on concrete pad. Based on CDM experience.
air/water separator tank	Based on CDM experience
air/water separator tank condensate disposal	Based on CDM experience
catalytic oxidation	Based on CDM experience
Natural Gas	Based on CDM experience

Table 19 Continued

SOUTHEAST ROCKFORD SOURCE CONTROL OPERABLE UNIT, AREA 7 ALTERNATIVE SCL-7E: SOIL VAPOR EXTRACTION (SVE)/AIR SPARGING (AS) ALONG GMZ BOUNDARY AND SOURCE AREA / MONITORING / GROUNDWATER USE RESTRICTIONS DETAILED COST ESTIMATE COMMENTS

COST COMPONENT	COMMENTS
Air Sparging (AS)	
AS well installation	Cost associated with installation of AS wells. Based on CDM experience.
AS main system	Vendor: includes blower. exp motor, inline silencer, pressure relief valve, unitized base, pressure gauge and a manual motor starting switch.
AS control panels	Vendor estimate
6" carbon steel piping	Based on CDM experience
4" carbon steel piping	Based on CDM experience
excavation for piping placement	12" wide trench and backfill, 48" deep as per 2000 Means
condensate disposal	Based on CDM experience
electrical power requirements (25 HP)	Based on 3-phase power, working 24 hrs/day, $0.09/kW-hr
AS treatment building	Costs for AS treatment building included with corresponding VRS
air/water separator tank	Costs for air/water separator tank included with corresponding VRS
catalytic oxidation treatment	Costs for catalytic oxidation treatment included with corresponding VRS

Table 20

SOUTHEAST ROCKFORD SOURCE CONTROL OPERABLE UNIT –AREA 7 ALTERNATIVE SCL-7E SOIL VAPOR EXTRACTION (SVE) AIR SPARGING (AS) ALONG GMZ BOUNDARY AND SOURCE AREA/MONITORING/ GROUNDWATER USE RESTRICTIONS DETAILED COST ESTIMATE

COST COMPONENT	Unit	No. Units	Unit Cost	Capital Cost	Construction / Installation Costs	Annual O&M Costs	Start-up & Baseline Costs
Groundwater Use Restrictions				**$25,000**	**$0**	**$0**	**$0**
egal fees	Is	1	$25,000	$25,000			
General				**$76,625**	**$40,000**	**$24,000**	**$50,000**
Const. (rental and delivery)	mo	3	$275	$825			
Mobilization	Is	1	$1000	$1,000			
Demobilization	Is	1	$1000	$1,000			
Decon facilities	e	1	$1000	$1,000			
health and safety equipment	M	3	$2000	$6,000		$24,000	
Electrical pwr service connection	Is	1	$5000	$5,000			
Electrical pwr service supply	M	3	$400	$1,200			
Water supply	M	3	$200	$600			
Pilot Scale Study	Is	1	$150,000	$60,000	$40,000		$50,000
Monitoring Wells				**$0**	**$120,000**	**$0**	**$0**
Monitoring well install. & materials	Well	5	$6000		$30,000		
Monitoring well install. & materials	well	15	$6000		$90,000		
Monitoring Well Sampling Analysis (per sampling event)				**$0**	**$0**	**$28,000**	**$0**
Labor	Hours	40	$60			$2,400	
Vehicle	Day	2	$60			$120	
Equipment	Is	1	$600			$600	
Miscellaneous	Is	1	$1000			$500	
Leachate laboratory analysis	Each	20	$230			$4,600	
Quarterly reports	Each	4	$5000			$20,000	
Vapor Recovery Systems (VRS)				**$671,000**	**$132,435**	**$112,700**	**$25,000**
VRS well installation	Each	16	$6000		$96,000		
VRS main system	Is	2	$50,000	$100,000	$20,000	$20,000	$25,000
VRS control panels	Is	2	$10,000	$20,000	$1,000	$4,000	
6" carbon steel piping	ft.	3000	$57	$171,000		$5,000	
4" carbon steel piping	ft	500	$32	$16,000		$3,200	
Excavation for piping placement	ft.	3500	$4.41		$15,435		
Electrical pwr reqmnts (10 HP)	yr.	1	$20,000			$20,000	
VRS treatment building (2 bldgs)	yr	800	$180	$144,000	Included		
Air/water separator tank	Is	2	$10,000	$20,000		$4,000	
Air/water separator tank cond.disp.-	Gal	260	$25			$6,500	
Catalytic Oxidation System	Is	1	$200,000	$200,000	Included	$40,000	
Natural Gas	Is	1	$10,000			$10,000	

Table 20 Continued

SOUTHEAST ROCKFORD SOURCE CONTROL OPERABLE UNIT –AREA 7 ALTERNATIVE SCL-7E SOIL VAPOR EXTRACTION (SVE) AIR SPARGING (AS) ALONG GMZ BOUNDARY AND SOURCE AREA/MONITORING/ GROUNDWATER USE RESTRICTIONS DETAILED COST ESTIMATE

COST COMPONENT	Unit	No. Units	Unit Cost	Capital Cost	Construction / Installation Costs	Annual O&M Costs	Start-up & Baseline Costs
Air Sparging (AS)				**$290,000**	**$378,935**	**$96,000**	**$25,000**
AS well installation	Each	57	$6,000		$342,000		
AS main system	Is	1	$100,000	$100,000	$20,000	$20,000	$25,000
As control panels	Is	1	$3,000	$3,000	$1,500	$600	
6" carbon steel piping	lf	3000	$57	$171,000		$34,200	
4"carbon steel piping	lf	500	$32	$16,000		$3,200	
Excavation for piping placement	lf	3500	$4.41		$15,435		
Condensate disposal	Gal	520	$25			$13,000	
Electrical pwr. Reqmnts. (25 HP)	year	1	$25,000			$25,000	
AS treatment building							
Air/water separator							
Catalytic oxidation treatment							

Table 21

SOUTHEAST ROCKFORD SOURCE CONTROL OPERABLE UNIT
ROCKFORD, ILLINOIS
FOCUSED FEASIBILITY STUDY
SOURCE AREA 7
ALTERNATIVE SCS-7E: SOIL VAPOR EXTRACTION (SVE)/AIR SPARGING (AS) ALONG SOURCE AREA / MONITORING / GROUNDWATER USE RESTRICTIONS
COST SUMMARY

	Item/Description	Total Cost
CAPITAL COSTS		
	Groundwater Use Restrictions	$25,000
	General	$167,000
	Leachate Monitoring Wells	$120,000
	VRS	$828,000
	Air Sparging	$694,000
	SUBTOTAL CONSTRUCTION COSTS [1]	**$1,834,000**
	Bid Contingency (15%)	$275,000
	Scope Contingency (20%)	$367,000
	Engineering and Design (15%)	$275,000
	Oversight/Health and Safety (5%)	$92,000
	TOTAL CAPITAL COSTS	**$2,843,000**
ANNUAL OPERATING AND MAINTENANCE COSTS		
	General	$24,000
	VRS Regular Maintenance/Electrical	$113,000
	Leachate Sampling and Analysis (per event)	$28,000
	Regular System Maintenance/Electrical	$96,000
	TOTAL ANNUAL COSTS	**$237,000**
REPLACEMENT COSTS		
	Leachate Monitoring Wells (every 15 years)	$29,000
	Equipment Replacement (e.g., motors, blowers) - every 15 years	$30,000
	TOTAL REPLACEMENT COSTS [2]	**$59,000**
PRESENT WORTH ANALYSIS		
	Total Capital Costs (from above) [3]	$2,843,000
	Present Worth Annual O&M Costs [4]	$1,636,000
	Leachate Sampling	
	Quarterly Sampling - years 1 and 2	$207,000
	Semi-annual Sampling - years 3 through 10	$295,000
	Present Worth Replacement Costs [5]	$0
	TOTAL PRESENT WORTH	**$4,981,000**

(1) Capital costs for construction items do not include oversight fees, which are accounted for separately.
(2) Replacement costs include construction and oversight capital costs.
(3) Capital costs represent the present worth of the given alternative.
(4) Present worth of annual O&M costs is based on a 7% discount rate over 10 years.
(5) Present worth of replacement costs is based on a 7% annual discount rate and no replacement of leachate monitoring wells and system equipment.

Table 22

SOUTHEAST ROCKFORD SOURCE CONTROL OPERABLE UNIT AREA 7 LEACHATE ALTERNATIVE SCL-7B MULTI-PHASE EXTRACTION/ COLLECT LEACHATE AND TREAT BY AIR STRIPPING UNIT / DISCHARGE TO ON-SITE SURFACE WATER / GROUNDWATER USE RESTRICTIONS/MONITORING
DETAILED COST ESTIMATE - COMMENTS

COST COMPONENT	COMMENTS
Groundwater Use Restrictions	
legal fees	Cost based on CDM experience
Leachate Containment System	
mobilization/demobilization for all	Cost based on CDM experience
treatment building	Based on 20 foot x 20 foot bldg. - cost based on Butler Building April 1998 estimate
electrical supply	Based on CDM experience
extraction well installation	4" diameter, stainless steel construction, 35 foot depth with 10 foot screen - cost based on CDM experience of average extraction well installation costs.
pump materials installation	1 pump per well (2 spare) @ 1.2 to 7 gpm flow with/control box each pump - costs based on April 1998 Grundfos cost estimate
2" dia. carbon steel pipe, from well to header	2" diameter carbon steel pipe, 10 foot linkages from each of the 9 wells to treatment unit (with 15% contingency) - cost based on CDM experience
4" dia. carbon steel header pipe to Central Pump Station	4" diameter carbon steel pipe, 10 foot linkages from header pipe to Central Pumping Station (with 15% contingency) - cost based on CDM experience
Central Pump Station	Includes controls - cost based on CDM experience
4" dia. carbon steel pipe from Central Pump Station to air stripper unit	4" diameter carbon steel pipe, 10 foot linkages from Central Pumping Station to treatment unit (with 15% contingency) - cost based on CDM experience
air stripping treatment unit and installation	Shallow Tray air stripper model 2631 with options - cost based on April 1998 North East Environmental Products, Inc. cost estimate
4" discharge pipe to creek	4" diameter carbon steel pipe, 10 foot linkages from treatment unit to Creek (with 15% contingency) - cost based on CDM experience
Leachate Monitoring Wells	
well installation and materials	Cost based on CDM experience in monitoring well installation
Leachate Treatment System Sampling and Analysis (per sampling event)	
Labor	Based on 10 hour work day at average CDM labor rate of $60 for oversight personnel
Vehicle	Based on $60/day rental fee for a field vehicle
Equipment	Based on CDM equipment rental rates
Miscellaneous	Incidental expenses (minor repairs, replacement of equipment, local purchases, etc)
leachate treatment system laboratory analysis	ts analysis; One duplicate and one blank will be collected per 10 samples.
Leachate Monitoring Well Sampling and Analysis (per sampling event)	
Labor	Based on 10 hour work day at average CDM labor rate of $60 for oversight personnel
Vehicle	Based on $60/day rental fee for a field vehicle
Equipment	Based on CDM equipment rental rates
Miscellaneous	Incidental expenses (minor repairs, replacement of equipment, local purchases, etc)
leachate laboratory analysis	Based on average cost incurred for volatile organic compound analysis; One duplicate and one blank will be collected per 10 samples.

Table 22 Continued

SOUTHEAST ROCKFORD SOURCE CONTROL OPERABLE UNIT AREA 7 LEACHATE ALTERNATIVE SCL-7B MULTI-PHASE EXTRACTION/ COLLECT LEACHATE AND TREAT BY AIR STRIPPING UNIT / DISCHARGE TO ON-SITE SURFACE WATER / GROUNDWATER USE RESTRICTIONS/MONITORING

DETAILED COST ESTIMATE - COMMENTS

COST COMPONENT	COMMENTS
Multi-Phase Extraction in Source Areas	
Multi-Phase Wells (40 ft., 4 inch PVC with development	Based on CDM experience
MPE System including enclosure	Based on Carbon Air cost estimate
Piping (2 in. PVC @ 3 ft. bgs)	Based on CDM experience
Air Stripper System Expansion	Based on Carbon Air cost estimate
Pilot Study	Based on CDM experience
O&M Materials and Labor	Based on Carbon Air cost estimate
Electricity	Based on Carbon Air cost estimate
Expanded Air Stripper O & M	Based on Carbon Air cost estimate
Expanded Air Stripper / Catalytic Oxidation	Based on Carbon Air cost estimate
Natural Gas	
Multi-Phase Extraction Monitoring	
Multi-Phase Extraction Monitoring Wells	Based on CDM experience
Continuous Recorders Multi-Phase MWs	Based on CDM experience
Pressure Monitoring Points	Based on CDM experience
Geophysical Survey	
Mob/Demob	Based on Ground Truth Environmental cost estimate
Per Diem	Based on Ground Truth Environmental cost estimate
Gamma Ray Logs	Based on Ground Truth Environmental cost estimate
EM-39 Logs	Based on Ground Truth Environmental cost estimate
SIP and VIP off set Logging Stations	Based on Ground Truth Environmental cost estimate

Table 23

SOUTHEAST ROCKFORD SOURCE CONTROL OPERABLE UNIT AREA 7 LEACHATE ALTERNATIVE SCL-7B MULTI-PHASE EXTRACTION/ COLLECT LEACHATE AND TREAT BY AIR STRIPPING UNIT/DISCHARGE TO ON-SITE SURFACE WATER / GROUNDWATER USE RESTRICTIONS/MONITORING DETAILED COST ESTIMATE

COST COMPONENT	Unit	No. Units	Unit Cost	Capital Cost	Construction/ Installation Costs	Annual O&M Costs	Start-up & Baseline Costs
Groundwater Use Restrictions				**$25,000**	**$0**	**$0**	**$0**
legal fees	ls	1	$25,000	$25,000			
Leachate Containment System				**$268,100**	**$52,400**	**$17,500**	**$0**
mobilization/demobilization	ls	1	$5,000	$5,000			
treatment building	ls	1	$40,000	$40,000			
electrical supply	ls	1	$5,000	$5,000			
extraction well materials and installation	well	8	$5,800		$46,400		
pump materials and installation	pump	10	$2,000	$20,000	$1,000	$2,500	
2" dia. carbon steel carbon steel pipe from well to header pipe	feet	160	$25	$4,000			
4" dia. carbon steel header pipe to Central Pump Station	feet	2,000	$32	$64,000			
Central Pump Station	ls	1	$54,500	$54,500		$5,000	
4" dia. carbon steel pipe from Central Pump Station to air stripper unit	feet	300	$32	$9,600			
air stripping treatment unit and installation	unit	1	$50,000	$50,000	$5,000	$10,000	
4" carbon steel discharge pipe to creek	feet	500	$32	$16,000			
Leachate Monitoring Wells				**$0**	**$22,500**	**$0**	**$0**
well installation and materials	well	5	$4,500		$22,500		
Leachate Treatment System Sampling and Analysis (per sampling event)				**$0**	**$0**	**$3,760**	**$0**
labor	hours	10	$60			$600	
vehicle	day	1	$60			$60	
equipment	ls	1	$600			$600	
miscellaneous	ls	1	$1,000			$500	
leachate treatment system laboratory analysis	each	2	$1,000			$2,000	
Leachate Monitoring Well Sampling and Analysis (per sampling event) [1]				**$0**	**$0**	**$6,310**	**$0**
labor	hour	60	$60			$3,600	
vehicle	day	3	$60			$180	
equipment	ls	1	$600			$600	
miscellaneous	ls	1	$1,000			$500	
leachate laboratory analysis	each	11	$130			$1,430	

Table 23 Continued

SOUTHEAST ROCKFORD SOURCE CONTROL OPERABLE UNIT AREA 7 LEACHATE ALTERNATIVE SCL-7B MULTI-PHASE EXTRACTION/ COLLECT LEACHATE AND TREAT BY AIR STRIPPING UNIT/DISCHARGE TO ON-SITE SURFACE WATER / GROUNDWATER USE RESTRICTIONS/MONITORING

DETAILED COST ESTIMATE

COST COMPONENT	Unit	No. Units	Unit Cost	Capital Cost	Construction/ Installation Costs	Annual O&M Costs	Start-up & Baseline Costs
Multi-Phase Extraction in Source Areas				**$425,000**	**$0**	**$92,500**	**$0**
Multi-Phase Wells (40 ft., 4 inch PVC with development	Each	10	$6,000	$60,000			
MPE System including enclosure	Ls	1	$200,000	$200,000			
Piping (2 in. PVC @ 3 ft bgs)	Lf	2000	$20	$40,000			
Air Stripper System Expansion	Ls	1	$75,000	$75,000			
Pilot Study	Ls	1	$50,000	$50,000			
O&M Materials and Labor	Ls	1	$55,000			$55,000	
Electricity	Ls	1	$9,500			$9,500	
Expanded Air Stripper O & M	Ls	1	$7,000			$7,000	
Expanded Air Stripper / Catalytic Oxidation	Ls	1	$7,000			$7,000	
Natural Gas	Ls	1	$14,000			$14,000	
Multi-Phase Extraction Monitoring				**$43,500**	**$0**	**$0**	**$0**
Multi-Phase Extraction Monitoring Wells	Each	6	$4,500	$27,000			
Continuous Recorders for Multi-Phase MWs	Each	6	$2,000	$12,000			
Pressure Monitoring Points	Each	9	$500	$4,500			
Geophysical Survey				**$85,600**	**$0**	**$0**	**$0**
Mob/Demob	Ls	1	$2,000	$2,000			
Per Diem	Ls	1	$5,000	$5,000			
Gamma Ray Logs	Well	6	$175	$1,050			
EM-39 Logs	Well	6	$175	$1,050			
SIP and VIP off set Logging Stations	Station	612	$125	$76,500			

TOTAL OF ALL ITEMS LISTED BELOW PER ALTERNATIVE

(1) The monitoring schedule over 30 years was assumed as:

Years 1,2 = quarterly sampling: Years 3 through 30 = semi-annual sampling (Based on RCRA Closure Guidelines)

These costs are incorporated in each alternative's cost summary under "Annual Operation and Maintenance."

Table 24

SOUTHEAST ROCKFORD SOURCE CONTROL OPERABLE UNIT FOCUSED FEASIBILITY STUDY
AREA 7 LEACHATE ALTERNATIVE SCL-7B: MULTI-PHASE EXTRACTION/COLLECT LEACHATE AND TREAT BY AIR STRIPPING UNIT / DISCHARGE TO ON-SITE SURFACE WATER / GROUNDWATER USE RESTRICTIONS/MONITORING
COST SUMMARY

Item/Description	Total Cost
CAPITAL COSTS	
Groundwater Use Restrictions	$25,000
Leachate Containment System	$321,000
Leachate Monitoring Wells	$23,000
Multiphase Extraction in Source Areas	$425,000
Multiphase Extraction Monitoring	$44,000
Geophysical Survey	$86,000
SUBTOTAL CONSTRUCTION COSTS [1]	**$924,000**
Bid Contingency (15%)	$139,000
Scope Contingency (20%)	$185,000
Engineering and Design (15%)	$139,000
Oversight/Health and Safety (5%)	$46,000
TOTAL CAPITAL COSTS	**$1,433,000**
ANNUAL OPERATING AND MAINTENANCE COSTS	
Leachate Containment System	$18,000
Leachate Treatment System Sampling and Analysis (per sampling event)	$4,000
Leachate Sampling and Analysis (per sampling event)	$6,000
Multi-Phase Extraction in Source Areas	$93,000
TOTAL ANNUAL COSTS	**$121,000**
REPLACEMENT COSTS [2]	
Leachate Containment System (every 15 years)	$281,000
Monitoring Well Replacement (every 15 years)	$44,000
TOTAL REPLACEMENT COSTS	**$325,000**
PRESENT WORTH ANALYSIS	
Total Capital Costs (from above) [3]	$1,433,000
Present Worth Annual O&M Costs [4]	$467,000
Leachate Treatment System Sampling	
Quarterly Sampling - years 1 through 30	$200,000
Leachate Sampling	
Quarterly Sampling - years 1 and 2	$44,000
Semi-annual Sampling - years 3 through 30	$128,000
Present Worth Replacement Costs [5]	$150,000
TOTAL PRESENT WORTH	**$2,422,000**

(1) Capital costs for construction items do not include oversight fees.

(2) Replacement costs include construction *and* oversight capital costs.

(3) Capital costs represent the present worth of the given alternative.

(4) The "Present Worth Annual O&M Cost" line item includes all annual costs except for costs per sampling and analysis event. Costs incurred for sampling and analysis are broken down per sampling schedule as listed. Sampling and analysis costs are based on a 7% discount rate over a 30 year projection for the Multi-Phase Extraction System (Based on RCRA Closure Guidelines).

(5) Present worth of replacement costs is based on a 7% annual discount rate and replacement of monitoring wells and leachate containment system (including central pump station, extraction wells, piping, pumps, and air stripping unit) every 15 years (twice over 30-year projection)

Table 25

SOUTHEAST ROCKFORD SOURCE CONTROL OPERABLE UNIT SOURCE AREA 11 LEACHATE ALTERNATIVE SCL-11A: NO ACTION / LEACHATE MONITORING / NATURAL ATTENUATION / GROUNDWATER USE RESTRICTIONS DETAILED COST ESTIMATE - COMMENTS

COST COMPONENT	COMMENTS
legal fees	Cost based on CDM experience
Leachate Monitoring Wells	
well installation and materials	Cost based on CDM experience in monitoring well installation
Leachate Monitoring Well Sampling and Analysis (per sampling event)	
Labor	Based on 10 hour work day at the average CDM labor rate of $60 for over site personnel
vehicle	Based on $60/day rental fee for a field vehicle
equipment	Based on CDM equipment rental rates
miscellaneous	Incidental expenses (minor repairs, replacement of equipment, local purchases, etc)
leachate laboratory analysis	Based on average cost incurred for VOCs and bioparameters; One duplicate and one blank will be collected per 10 samples.
Air Sparging (AS)	
AS well installation	Cost associated with installation of AS wells. Based on CDM experience.
AS main system	Vendor: includes blower, exp motor, inline silencer, pressure relief valve, unitized base, pressure gauge and a manual motor starting switch.
AS control panels	Vendor estimate
6" carbon steel piping	Based on CDM experience
4" carbon steel piping	Based on CDM experience
excavation for piping placement	12" wide trench and backfill, 48" deep as per 2000 Means
condensate disposal	Based on CDM experience
electrical power requirements (25 HP)	Based on 3-phase power, working 24 hrs/day, $0.09/kW-hr
AS treatment building	Costs for AS treatment building included with corresponding VRS
air/water separator tank	Costs for air/water separator tank included with corresponding VRS
catalytic oxidation treatment	Costs for catalytic oxidation treatment included with corresponding VRS

Table 26

SOUTHEAST ROCKFORD SOURCE CONTROL OPERABLE UNIT SOURCE AREA 11 - LEACHATE

ALTERNATIVE SCL-11A: NO ACTION /LEACHATE MONITORING /NATURAL ATTENUATION/GROUNDWATER USE RESTRICTIONS

DETAILED COST ESTIMATE

COST COMPONENT	Unit	No. Units	Unit Cost	Capital Cost	Construction / Installation Costs	Annual O&M Costs	Start-up & Baseline Costs
Groundwater Use Restrictions				**$25,000**	**$0**		**$0**
legal fees	ls	1	$25,000	$25,000			
Leachate Monitoring Wells				**$0**	**$18,000**	**$0**	**$0**
Well installation and materials	well	4	$4,500		$18,000		
Sampling and Analysis (per sampling event)				**$0**	**$0**	**$7,920**	**$0**
Labor	hours	60	$60			$3600	
Vehicle	day	3	$60			$180	
Equipment	ls	1	$1,000			$600	
Miscellaneous	ls	1	$1,500			$500	
Leachate laboratory analysis	each	8	$380			$3040	
Air Sparging				**$134,000**	**$102,146**	**$54,440**	**$25,000**
AS well installation	each	13	$6,000		$78,000		
AS main system	ls	1	$100,000	$100,000	$20,000	$20,000	$25,000
AS control panels	ls	1	$3,000	$3,000	$1,500	$600	
6" carbon steel piping	lf	500	$57	$28,500		$5,700	
4" carbon steel piping	lf	100	$32	$3,200		$640	
Excavation for piping placement	lf	600	$4.41		$2,646		
Condensate disposal	gal	100	$25			$2,500	
Electrical power requirements	year	1	$25,000			$25,000	
AS treatment building	Costs for AS treatment building included with corresponding VRS						
air/water separator tank	Costs for air/water separator tank included with corresponding VRS						
catalytic oxidation treatment	Costs for catalytic oxidation treatment included with corresponding VRS						

Table 27

FOCUSED FEASIBILITY STUDY, SOURCE AREA 11 – LEACHATE
ALTERNATIVE SCL-11A: NO ACTION/LEACHATE MONITORING/NATURAL ATTENUATION/GROUNDWATER USE RESTRICTIONS
COST SUMMARY

Item/Description	Total Cost
CAPITAL COSTS	
Groundwater Use Restrictions	$25,000
Leachate Monitoring Wells	$18,000
Air Sparging	$262,000
SUBTOTAL CONSTRUCTION COSTS	**$305,000**
Bid and Scope Contingency (20%)	$61,000
Oversight/Health and Safety (5%)	$15,000
TOTAL CAPITAL COSTS	**$381,000**
ANNUAL OPERATING AND MAINTENANCE COSTS	
Leachate Sampling and Analysis (per event)	$8,000
Air Sparging	$54,000
TOTAL ANNUAL COSTS[1]	**$62,000**
REPLACEMENT COSTS[2]	
Monitoring Well Replacement (every 15 years)	$29,000
TOTAL REPLACEMENT COSTS	**$29,000**
PRESENT WORTH ANALYSIS	
Total Capital Costs (from above)[3]	$381,000
Present Worth Annual O&M Costs [4]	$379,000
Leachate Sampling	
Quarterly Sampling - years 1 and 2	$59,000
Semi-annual Sampling - years 3 through 30	$170,000
Present Worth Replacement Costs [5]	$14,000
TOTAL PRESENT WORTH	**$1,003,000**

(1) Capital costs for construction items do not include oversight fees.
(2) Replacement costs include construction *and* oversight capital costs.
(3) Capital costs represent the present worth of the given alternative.
(4) The "Present Worth Annual O&M Cost" line item includes all annual costs except for costs per sampling and analysis event. Costs incurred for sampling and analysis are broken down per sampling schedule as listed. Sampling and analysis costs are based on a 7% discount rate over a 30-year projection (Based on RCRA Closure Guidelines).
(5) Present worth of replacement costs is based on a 7% annual discount rate and replacement of monitoring wells replacement every 15 years.

Table 28

SOUTHEAST ROCKFORD SOURCE CONTROL OPERABLE UNIT
AREA 9/10 – SOIL
ALTERNATIVE SCS-9/10C: SOIL VAPOR EXTRACTION (SVE)
DETAILED COST ESTIMATE - COMMENTS

COST COMPONENT	COMMENTS
General	
Construction Trailer(rental and delivery)	
Mobilization	Heavy equipment and trailers, per vendor estimate
demobilization	Allowances for trailer and equipment demobilization
Decon facilities	
Health and safety equipment	Allowances based on CDM equipment rates
Electrical power supply	Based upon expected electrical costs per month for this alternative
Water supply	Based upon expected use per month for this alternative
Soil Vapor Extraction (SVE)	
SVE well installation	Cost associated with installation of SVE wells. Based on CDM experience
SVE main system	Vendor: Includes blower, exp motor, inline air filter, silencers, dilution valve, moisture separator, condensate transfer pump, high condense, level alarm, vac. Relief valve, vac. gauges, skid mounting, interconnecting piping and a manual motor switch.
SVE control panels	Vendor estimate-NEEP (May 1998)
6" carbon steel piping	Based on CDM experience
4" carbon steel piping	Based on CDM experience
Excavation for piping placement	12" wide trench and backfill, 36" deep as per 1996 means
Electrical power requirements 25 HP	Based on 3-phase power, working 24 hrs/day, $0.09/kW-hr
SVE treatment building	Based on prefabricated building on concrete pad. Based on CDM experience
Air/water separator tank	Based on CDM experience
Activated carbon emissions treatment	Based on an estimate form Carbtrol (6/98)for a G-7Absorber carbon unit w/1600 lbs of vapor phase activated carbon designed for 2000 cfm flows
Activated carbon recharge (1600 lb unit)	Based on carbon use 3lb/day and 365 days/year, rate of 1.50/lb carbon recharge
Activated carbon disposal	Based on carbon used per 365/year, rate of $2.00 per lb of carbon
Sampling	Based on CDM experience
Post Treatment Sampling	
Test kits/Field Screening(per year)	Based on CDM experience and average test kit costs-25 samples per test kit, samples collected on a grid of 1 sample /250cy contamination. material ; 1sampling grid per 2weeks
Laboratory analysis (VOCs N,P) (per year)	Based on 1998 sample analysis costs from Midwest laboratories; samples collected on a grid of 1 sample /250cy contamination. material ; 1 sampling grid per 2weeks
Shipping and handling (per year)	Costs associated with transporting samples from site to laboratory twice per month

Table 29
SOUTHEAST ROCKFORD SOURCE CONTROL OPERABLE UNIT
SOURCE AREA 9/10-
ALTERNATIVE SCS-9/10C: SOIL VAPOR EXTRACTION(SVE)
DETAILED COST ESTIMATE

COST COMPONENT	Unit	No. Units	Unit Cost	Capital Cost	Construction / Installation Costs	Annual O&M Costs	Start-up & Baseline Costs
General				**$3,000**	**$0**	**$18,300**	**$0**
Construction trailer (rental and delivery)	Mo	1	$3,300			$3,300	
Mobilization	ls	1	$1,000	$1,000			
Demobilization	ls	1	$1,000	$1,000			
Decon facilities	Ea	1	$1,000	$1,000			
Health and safety equipment	Yr	1	$9,000			$9,000	
Electrical power	Yr	1	$3,600			$3,600	
Water supply	yr	1	$2,400			$2,400	
Soil Vapor Extraction				**$126,140**	**$32,016**	**$163,900**	**$0**
SVE well installation	ea	4	$6,000		$24,000		
SVE main system	unit	1	$18,000	$18,000	$6,000		
SVE control panels	unit	1	$3,000	$3,000	$1,500	$500	
6" carbon steel piping	Ft	720	$57	$41,040			
4"carbon steel piping	Ft.	50	$32	$1,600			
Excavation for piping treatment	Ft.	770	$0.67		$516		
Electrical power requirements (25 H.P.)	ls	1	$25,000			$25,000	
SVE treatment building	sf	500	$100	$50,000	included		
Air/water separator	ls	1	$5,000	$5,000		$500	
Activated carbon emissions treatment	ls	1	$7,500	7,500		$1,000	
Activated carbon recharge (1,600 lb recharge)	yr	30	$1,640			$49,200	
Activated carbon disposal	yr	30	$2,190			$65,700	
Sampling	ea	8	$1,500			$12,000	
Post Treatment Sampling				**$0**	**$0**	**$147,000**	**$0**
Test kits/Field Screening (per year)	samples	34	$300			$10,200	
Laboratory Analysis(VOCs,N,P) (per year)	samples	672	$200			$134,400	
Shipping and handling (per year)	shipmt	24	$100			$2,400	

Table 30
SOUTHEAST ROCKFORD SOURCE CONTROL OPERABLE UNIT
SOURCE AREA 9/10
ALTERNATIVE SCS-9/10C SOIL VAPOR EXTRACTION
COST SUMMARY

Item/Description	Total Cost
CAPITAL COSTS	
General	$3,000
Soil Vapor Extraction (w/emission controls)_	$158,000
SUBTOTAL CONSTRUCTION COSTS	**$161,000**
Bid Contingency (10%)	$16,000
Scope Contingency (10%)	$16,000
Engineering and Design (15%)	$24,000
Oversight/Health and Safety (5%)	$8,000
ANNUAL OPERATING AND MAINTENANCE COSTS	
General	$18,000
Regular System Maintenance /Electrical	$164,000
Post Treatment Sampling	$147,000
TOTAL ANNUAL COSTS	**$329,000**
REPLACEMENT COSTS	
TOTAL REPLACEMENT COSTS	**$0**
PRESENT WORTH ANALYSIS	
Total Capital Costs	$225,000
Present Worth Annual O&M Costs	$4,083,000
Present Worth Replacement Costs	$0
TOTAL PRESENT WORTH	**$4,308,000**

Table 31

SOUTHEAST ROCKFORD SOURCE CONTROL OPERABLE UNIT AREA 9/10
ALTERNATIVE SCL-9/10E: AIR SPARGING(AS) ALONG GMZ BOUNDARY AND SOURCE AREA/MONITORING /GROUNDWATER USE RESTRICTIONS
DETAILED COST ESTIMATE - COMMENTS

COST COMPONENT	COMMENTS
Groundwater Use Restrictions	
Legal fees	Cost based on CDM experience
General	
Construction trailer (rental and delivery)	50 X 12 ft const. trailer - $1.65/mi delivery fee (100mi)-rental allowance per 1996 means
mobilization	Heavy equipment and trailers, per vendor estimate
demobilization	Allowance for trailer and equipment demobilization
Decon facilities	Based upon level of personal and vehicle decontamination anticipated for this alternative.
Health and safety equipment	Allowance based on CDM equipment rates.
Electrical power service supply	Based on expected electrical costs per month for this alternative
Water supply	Based on expected use per month for this alternative (e.g. decon, personnel Use)
Leachate Monitoring Wells	
Well installation and materials	Cost based upon CDM experience in monitoring well installation.
Leachate and Containment System Sampling and Analysis	
labor	Based on 10 hour work day at the average CDM labor rate of $60 for oversight personnel
vehicle	Based on $300/week rental fee for a field vehicle
Equipment	Based on CDM equipment rental rates
miscellaneous	Incidental expenses (minor repairs, replacement of equipment, local Purchases, etc.)
Leachate laboratory analysis	Based on an average cost incurred for VOC analysis; One duplicate and one blank will be collected per 10 samples.
Vapor Recovery System (VRS)	
VRS installation	Cost associated with installation of SVE wells. Based on CDM experience
VRS Main System	Vendor: includes blower, exp motor, inline filter, silencers dilution valve Moisture separator, condensate transfer pump, level alarm, Vacuum gauges, skid mounting, interconnecting piping and manual motor start switch.
VRS control panels	Vendor estimate- NEEP (May 1996)
6" carbon steel pipe	Based on CDM experience
4" carbon steel pipe	Based on CDM experience
Excavation for piping placement	12"wide trench and backfill, 36" deep as per 1996 means
Electrical power requirements 10 h.p	Based on 3-phase power working 24 hours/day, $0.09 kW-hr
VRS Treatment building	Basic prefabricated building on concrete pad. Based on CDM experience.
Air/water separator tank	Based on CDM experience
Activated carbon	Based on CDM experience

Table 31 Continued

SOUTHEAST ROCKFORD SOURCE CONTROL OPERABLE UNIT AREA 9/10
ALTERNATIVE SCL-9/10E: AIR SPARGING(AS) ALONG GMZ BOUNDARY AND SOURCE AREA/MONITORING /GROUNDWATER USE RESTRICTIONS
DETAILED COST ESTIMATE - COMMENTS

COST COMPONENT	*COMMENTS*
Air Sparging (AS)	
AS well installation	Cost Associated with installation of AS wells. Based on CDM experience
AS min system	Vendor: includes blower, exp motor, inline silencer, pressure relief valve Unitized base, pressure gauge and a manual motor switch.
AS control panels	Vendor estimate
6" carbon steel piping	Based on CDM experience
4" carbon steel piping	Based on CDM experience
Excavation for piping placement	96 Means
Electrical power requirements (25 HP)	Based on 3 phase power, working 24 hours/day, 0.09kW-hr
AS treatment building	Costs for AS treatment building included with corresponding VRS
Air/water separator tank	Costs for air/water separator tank included with VRS
Activated carbon treatment	Costs for carbon air treatment included with corresponding VRS

Table 32

SOUTHEAST ROCKFORD SOURCE CONTROL OPERABLE UNIT SOURCE AREA9/10
LEACHATE ALTERNATIVE SCL-9/10E. AIR SPARGING (AS) ALONG GMZ
BOUNDARY AND SOURCE AREA/ MONITORING/GROUNDWATER USE RESTRICTIONS
DETAILED COST ESTIMATE

COST COMPONENT	Unit	No. Units	Unit Cost	Capital Cost	Construction/ Installation Costs	Annual O&M Costs	Start-up & Baseline Costs
Groundwater Use Restrictions				**$25,000**			
Legal fees	ls	1	$25,000	$25,000			
General				**$1,038,000**	**$0**	**$0**	
trailer(rental and delivery)	mo	360	$275	$99,000			
mobilization	ls	1	$1,000	$1,000			
demobilization	ls	1	$1,000	$1,000			
Decon facilities	Ea	1	$1,000	$1,000			
Health and safety equipment							
Electrical power service	Mo	360	$2,000	$720,000			
supply	Mo	360	$400	$144,000			
Water supply	mo	360	$200	$72,000			
Leachate Monitoring Wells			**$0**	**$0**	**$22,500**	**$0**	**$0**
Well installation and materials	well	5	$4,5000	&0	$22,500		
Leachate Monitoring Well Sampling And Analysis (per event)				**$0**	**$0**	**$3,270**	**$0**
labor	hours	20	$60			$1,200	
vehicle	days	1	$60			$60	
equipment	ls	1	$600			$600	
miscellaneous	ls	1	$1,000			$500	
Leachate laboratory analysis	each.	7	$130			$910	
Vapor Recovery System				**$355,000**	**$67,059**	**$25,500**	**$0**
VRS well installation	ea	10	$6,000		$60,000		
VRS main system	ls	2	$14,000	$14,000	$5,000	$10,000	
VRS control panels	ls	2	$3,000	$3,000	$1,000	$500	
6" carbon steel piping	Ft	1530	$57	$87,210			
4" carbon steel piping	Ft	50	$32	$1600			
Excavation- piping placement	Ft	1580	$0.67		$1,059		
Elect. Pwr. requirements10 hp	yr	1	$20,000			$10,000	
VRS treatment building (2)	sf	800	$100	$80,000	included		
Air/water separator tank	ls	2	$5,000	$10,000		$1,000	
Carbon adsorption,emissions	ls	2	$80,000	$160,000	included	$4,000	

Table 32 Continued

SOUTHEAST ROCKFORD SOURCE CONTROL OPERABLE UNIT SOURCE AREA9/10
LEACHATE ALTERNATIVE SCL-9/10E, AIR SPARGING (AS) ALONG GMZ
BOUNDARY AND SOURCE AREA/ MONITORING/GROUNDWATER USE RESTRICTIONS
DETAILED COST ESTIMATE

COST COMPONENT	Unit	No. Units	Unit Cost	Capital Cost	Construction/ Installation Costs	Annual O&M Costs	Start-up & Baseline Costs
Air Sparging (AS)				**$131,950**	**$98,907**	**$35,500**	**$0**
AS well installation	ea	15	$6,000		$90,000		
As main system	ls	1	$18,000	$18,000	$6,000	$10,000	
As control panels	ls	1	$3,000	$3,000	$1,500	$500	
6" carbon steel piping	lf	1750	$57	$99,750			
4" carbon steel piping	lf	350	$32	$11,200			
Excavation - piping placement	lf	2100	$0.67		$1407		
Elect. Pwr. requirements25 hp	year	1	$25,000			$25,000	
AS treatment building	Included above						
Air/water separator tank	Included above						
Activated carbon treatment	Included above						

Table 33

SOUTHEAST ROCKFORD SOURCE CONTROL OPERABLE UNIT SOURCE AREA 9/10 LEACHATE ALTERNATIVE SCL-9/10E AIR SPARGING (AS) ALONG GMZ BOUNDARY AND SOURCE AREA/LEACHATE MONITORING/GROUNDWATER USE RESTRICTIONS COST SUMMARY

Item/Description	Total Cost
CAPITAL COSTS	
Groundwater Use Restrictions	$25,000
General	$1,038,000
Leachate Monitoring Wells	$23,000
VRS	$423,000
Air Sparging	$231,000
Subtotal Construction Costs	**$1,740,000**
Bid Contingency 15%	$261,000
Scope Contingency 20%	$348,000
Engineering and Design 15%	$261,000
Oversight/Health and Safety	$87,000
Total Capital Costs	**$2,697,000**
Annual Operating and Maintenance Costs	
VRS Regular Maintenance/Electrical	$26,000
Leachate Sampling and Analysis per event	$3,000
Regular System Maintenance/Electrical	$36,000
Total Annual Costs	**$65,000**
Replacement costs	
Leachate Monitoring Wells (every 15 years)	$29,000
Equipment (eg. Blowers motors) every 15 years	$30,000
Total Replacement Costs	**$59,000**
Present Worth Analysis	
Total Capital costs (from above)	$2,697,000
Present Worth Annual O&M Costs	$807,000
Quarterly Leachate Sampling-years 1&2	$22,000
Semi-annual Sampling –years 3 through 30	$64,000
Present Worth Replacement Costs	$29,000
Total Present Worth	**$3,619,000**

(1). Capital costs for construction items do not include oversight fees, which are accounted for separately.
(2). Replacement costs include construction and oversight capital costs
(3). Capital costs represent the present worth of the given alternative
(4). Present worth of annual O&M cost is based on a 7% discount rate over a life of 30 years.
(5). Present worth of replacement costs is based on a 7% annual discount rate and replacement of system equipment every 15 years (once over a 30 year projection)

STATUTORY DETERMINATIONS

PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT

The risk posed by drinking contaminated groundwater and the risk posed by the contaminated soil in the four source areas were considered separately by the Illinois EPA and U.S. EPA for the Southeast Rockford Groundwater Contamination project. In October 1995, after carefully considering public comment, the Illinois EPA and U.S. EPA chose "Use Restrictions" as the remedy for the area groundwater that predictably would be impacted by contamination within the next 70 years. The remedy for the groundwater was implemented in 1998.

A human health risk assessment was conducted on the soil in each of the four source areas. The human health risk assessment followed a tiered approach, in conformance with Tiered Approach to Corrective Action Objectives (TACO). TACO is a program used by the Illinois EPA for developing remediation objectives for contaminated soil and groundwater. Development of these remediation objectives includes protecting human health and the environment and takes into account site conditions and land use. TACO must work within existing laws and regulations, therefore, the use of TACO for the development of remediation objectives for the Southeast Rockford Groundwater Contamination Site needed to meet guidelines in accordance with CERCLA, RAGS, RCRA, and 35 Ill. Adm. Code Part 620.

Three exposure pathways were considered in this assessment: (1) direct contact with soil (including ingestion and inhalation); (2) the soil component of the groundwater ingestion pathway; and (3) ingestion of vegetables. An evaluation was conducted for the direct contact with soil pathway and the soil component of the groundwater pathway. Chemical concentrations found at the site were compared to a combination of pre-established screening values, background concentrations and practical quantitation limits (PQLs). A PQL is the level at which a chemical can be reliably measured in the laboratory.

A risk assessment was also conducted for the soil component of the groundwater pathway (for chemicals which exceeded values established under Tier 1 assessment) and the ingestion of vegetables pathway for Area 7 only. Based on land use in this area, the close proximity of farmland, and the absence of institutional controls, it was determined that an agricultural scenario could not be ruled out.

Sampling data collected from the surface and subsurface soil of each of the four source areas were compared to the Tier 1 Exposure Route-Specific Values (ingestion and inhalation) for soil protective of residential areas and the Soil Component of the Groundwater Ingestion Exposure Route Values for Class I groundwater. The direct contact (ingestion and inhalation) values are protective of direct contact with soil, while the soil component of the groundwater protection values are protective of groundwater impacted by contaminants that could leach from soil.

As directed by Illinois EPA, it was assumed that all four-source areas were, or could become, residential areas. Currently, no land use restrictions are in place to prevent residential development or expansion. Therefore, it was necessary to employ soil remedial objectives that would be protective of residential land use. Because the exposure assumptions for the residential

scenario are standardized, with few site-specific modifications, there was no advantage in developing Tier 3 values. Therefore, Tier 1 values were used.

Because several chemicals (that could impact groundwater) exceeded Tier 1 objectives for soil, Tier 3 soil remediation objectives (SROs) were developed. Tier 3 risk-based soil levels protective of groundwater are presented in Tables in this ROD for each Source Area. The SROs are back-calculated from the Groundwater Remediation Objective (GRO) presented for Class I Groundwater in Section 742, Appendix B: Table F of TACO. While most of the GROs are based on a hazard index of 1.0 or a cancer risk of one in one million, in some cases, the GRO is based on a higher cancer risk. Therefore, a mixture assessment was conducted according to the Illinois EPA mixture rule issued under Docket C of the Illinois Pollution Control Board (December 4, 1997) to determine what the risks would be if all of the SROs for the soil to groundwater pathway were achieved. This assessment demonstrated that, in accordance with TACO, total cancer risk associated with the SROs for the soil to groundwater pathway would not exceed an excess lifetime risk of one in ten thousand or a hazard index of 1.0 if all SROs were achieved.

RESULT OF THE DIRECT PATHWAY (TIER 1)

The results of the Tier 1 assessment of the direct contact pathway can be summarized as follows:

- Maximum concentrations of volatile organic compounds (VOCs) did not exceed their respective Tier 1 values in any of the focus areas.

- Maximum concentrations of semi-volatile organic compound (SVOCs) and inorganics exceeded their respective direct contact (ingestion and inhalation) Tier 1 values in all four areas.

- Maximum concentrations of inorganics and one SVOC in Area 7, (benzo (a) pyrene), were dropped from further evaluation, because detected concentrations were less than or consistent with background concentrations. Risk associated with these chemicals are below 1×10^{-6} (1E-06, one in one million) and/or a hazard index of 1.0.

- Selected samples in Areas 4 (SS4-201, SS4-203, SS4-203D) and 11 (SS11-206, SS11-207) were identified as "hot spots" that exceeded a Tier 1 value and the Practical Quantitation Limit (PQL).

- Three out of four samples in Area 9/10 (SS910-101, SS910-103, SS910-104) exceeded one or more Tier 1 values. These data are presented in Appendix B. The "hot spots" in Areas 4 and 11 and the samples exceeding a Tier 1 value in Area 9/10 will be addressed in the FFS. The FFS will evaluate whether or not additional SVOC data may be needed in the remedial design phase to better characterize risk and the extent of contamination. Based on the results of sampling, if necessary, remedial alternatives that address SVOCs would be developed and evaluated. The presence of these hot spots represents a potential exceedence of risk limits established by the U.S. EPA (a noncancer hazard index of 1.0 and cancer risks of between one in one million and one in one hundred thousand) and the Illinois EPA (a noncancer index of 1.0 and cancer risks of one in one million used to develop the Tier 1 values), depending on actual exposure.

RESULTS OF THE SOIL TO GROUNDWATER PATHWAY (TIER 1)

The results of the Tier 1 assessment of the soil to groundwater pathway can be summarized as follows:

- Several chemicals were dropped from further evaluation for the soil to groundwater pathway because they were not detected in groundwater (Dieldrin, carbazole and several SVOCs).

- VOCs in surface soil in Area 4 and VOCs in subsurface soil in all four areas exceeded Tier 1 soil component of the groundwater protection values. These VOCs were further evaluated in Tier 3. A Tier 3 assessment was conducted for those chemicals that exceeded a soil component of the groundwater protection value and were detected in groundwater during past sampling events at greater than 5 percent frequency of detection. The Tier 3 assessment consisted of calculating soil concentration protective of groundwater at a designated point of compliance.

RESULTS OF THE SOIL COMPONENT OF THE GROUNDWATER INGESTION PATHWAY (TIER 3)

The results of the Tier 3 assessment of the soil component of the groundwater ingestion pathway can be summarized as follows:

- Chemicals of concern in Areas 4, 7, and 11 exceed their respective SROs. Two additional chemicals of concern in Area 11 exceed their respective saturation concentrations, but not the calculated SRO. Risks associated with chemicals that exceed an SRO in Areas 4, 7 and 11 exceed Illinois EPA cancer risk limits of one in one million or a hazard index of 1.0.

- All areas where detected concentrations exceeded the lower of the SRO or saturation concentration were further evaluated in the FFS. Volumes estimates were developed for these areas for excavation or remediation purposes.

- Area 7 borders land currently used for agricultural purposes, and no current zoning restrictions prevent conversion of some of the undeveloped portions of Area 7 to agricultural use. For these reasons, a semi-quantitative evaluation was conducted to determine whether the use of Area 7 for growing vegetables or fruits would result in an unacceptable risk to human health. Based on this evaluation, it is concluded that ingestion of vegetables (or fruits which have a fresh weight consumption rate lower than vegetables, i.e., 88 mg/day) would not result in exceedence of either a hazard index of 1.0 or a cancer risk of 1E-06 (one in one million), which are the risk limits on which the Tier 1 values are based.

CONCLUSION

A combination of a Tier 1 and Tier 3 assessment was used to assess risks to human health. At Areas 4, 7, 9/10 and 11, Tier 1 was used to evaluate the direct contact pathway and the migration of soil to groundwater. Tier 3 was used to evaluate the migration of soil to groundwater pathway (for those chemicals that exceeded Tier 1 values) and the ingestion of vegetables pathway (for Area 7 only). The Tier 1 assessment resulted in the identification of SVOCs above Tier 1 values in Areas 4, 9/10 and 11. If these SVOCs were removed, all remaining concentrations of SVOCs

would be less than the higher of the PQL or Tier 1 concentration. The Tier 3 Assessment resulted in remediation goals for VOCs in all four-source areas and was also used to develop a remediation plan.

SUMMARY OF ECOLOGICAL RISK ASSESSMENT OF SOIL IN AREA 7

Although the 1995 groundwater ROD concluded that the contaminated groundwater did not pose a long-term environmental (ecological) risk to the Rock River, Illinois EPA is required to consider the ecological risk of the contaminated soil in the source areas. However, TACO may not be used to establish ecological remediation goals. Therefore, an ecological assessment was conducted at Area 7 per U.S. EPA guidelines. Ecological assessments were not conducted at Areas 4, 9/10 and 11, because site characteristics (consisting mostly of pavement and buildings) are not highly suitable as habitat for significant populations of plants and animals. Also, some corrective action objectives cannot be used because, as they are currently designed, TACO values only consider human health risk and not environmental risk.

An Ecological Risk Assessment (ERA) was conducted at Area 7 to evaluate the likelihood that adverse ecological effects may occur (or are occurring) at the site as a result of exposure to single- or multiple-chemical stressors. Risks result because of contacts between ecological receptors and stressors that are sufficiently long in duration and of sufficient intensity to elicit adverse effects. The primary purpose of this screening-level ERA is to identify contaminants in surface water and sediment that can result in adverse effects to present or future ecological receptors.

This ERA is based primarily on a screening-level approach in which measured chemical concentrations in surface water and sediment are compared to relevant-effect concentrations. This ERA is intended to provide information that can help establish remedial priorities and serve as a scientific basis for regulatory and remedial actions for the site. The general approach used to conduct this ERA is based on site-specific information and on recent EPA guidance, primarily Ecological Risk Assessment Guidance for Superfund: Process for Designing and Conducting Ecological Risk Assessments (EPA 1997a), supplemented by Guidance for Ecological Risk Assessment (EPA 1998).

Risks to ecological receptors are summarized below, within categories designated as low risk and risk. No sources of moderate or high risks are identified for this ERA. The differentiation of low and no risks is used to evaluate the relative risks associated with specific stressors compared to all other potential contributors to risks. These designations are based on both the quantitative risk estimates presented previously and best professional judgment.

LOW RISK

- Sensitive aquatic biota such as benthic invertebrates can be adversely affected by direct contact with surface water in the creek adjacent to Area 7. The only COPC of concern in water at this location is:
  1,1,1-trichloroethane

- Similar organisms may be additionally at risk from direct contact with creek sediments. Major sediment-associated COPCs at this location include:
  benzo(a)anthracene
  methoxychlor
  chrysene

NO RISK

- Aquatic and semi-aquatic organisms do not appear to be at significant risk from any other COPCs identified at this site.

- Consumers of aquatic and semi-aquatic organisms (e.g., piscivorous birds, omnivorous upper trophic level predators), represented by belted kingfisher and red fox, respectively, do not appear to be at significant risk.

APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS (ARARs)

The remedies for the ROD are subject to federal Applicable or Relevant and Appropriate Requirements (ARARs) and any more stringent state regulations. The determination of ARARs has been made in accordance with Section 121(d)(2) of CERCLA, as amended by the Superfund Amendments and Reauthorization Act (SARA) of 1986, and the Small Business Liability Relief and Brownfields Revitalization Act of 2002. These ARARs are also consistent with the National Contingency Plan (NCP) 40 CFR Part 300; amended March 8, 1990. ARARs are federal, or more stringent state requirements, that the remedial alternative(s) must achieve, that are legally applicable to the substance or relevant and appropriate under the circumstances. Administrative requirements such as obtaining permits and agency approvals, record keeping, reporting and off-site activities such as waste disposal regulated by state or municipalities would also be considered applicable or relevant and appropriate regulations. It is important to note that, as identified at Section 121(e) of CERCLA, and in the NCP at 40 CFR 300.400(e), no federal, state, or local permits are required for any remedial actions conducted entirely on-site. However, all on-site emissions and/or discharges would need to attain a level of treatment and management meeting all substantive technical requirements that might otherwise be included in a permit. Any emissions or discharges that leave the site or any response actions that are conducted off-site are subject to all applicable permitting requirements.

The status of a requirement under Section 121(d) of CERCLA and other environmental laws, both federal and state, may be either applicable or relevant and appropriate to the remedial alternative, but not both. The NCP (40 CFR 300.5) defines these terms as follows:

APPLICABLE REQUIREMENTS

Those clean-up standards, standards of control, and other substantive requirements, criteria, or limitations promulgated under federal or state environmental or facility siting laws that specifically address a hazardous substance, pollutant, contaminant, remedial action, location, or other circumstance found at a CERCLA site. Only those state standards that are identified by a state in a timely manner and that are more stringent than federal requirements may be applicable.

RELEVANT OR APPROPRIATE REQUIREMENTS

Those clean-up standards, standards of control and other substantive requirements, criteria or limitations described above, that, while not applicable, address problems or situations sufficiently similar to those encountered at a CERCLA site that their use is well-suited to the particular site.

In addition to ARARs, the U.S. EPA has identified federal and state non-promulgated criteria, advisories and guidance as requirements to be considered (TBC) as part of the FS analysis. TBCs are used on an as appropriate basis in developing clean-up standards. TBCs do not have the same status as ARARs and are not considered to be required clean-up standards because they are not promulgated regulations.

OTHER REQUIREMENTS TO BE CONSIDERED (TBCs)

Non-promulgated federal and state advisories or guidance documents do not have status as potential ARARs; however, these advisories or guidance documents may be considered in determining the necessary level of cleanup for the protection of health or the environment. As specified in 40 CFR 300.430(f)(1)(ii)(C)(1) – (6), a remedial alternative that does not meet an ARAR under federal or state environmental laws can still be selected given any of the following six limited circumstances:

- The alternative is an interim measure and will become part of a total remedial action that will attain the applicable or relevant and appropriate federal or state requirement;
- Compliance with the requirement will result in greater risk to human health and the environment than other alternatives;
- Compliance with the requirement is technically impracticable from an engineering perspective (e.g., technical impracticability waiver for groundwater);
- The alternative will attain a standard or performance that is equivalent to that required under an otherwise applicable standard, requirement, or limitation through the use of another method or approach;
- With respect to a state requirement, the state has not consistently applied, or demonstrated the intention to consistently apply, the promulgated requirement in similar circumstances at other remedial actions within the state; and
- For Superfund-financed response actions only, an alternative that attains the ARAR will not provide a balance between the need for protection of human health and the environment with the availability of fund monies to respond to other sites that may present a threat to human health and the environment.

TYPE/STATUS OF ARARs

ARARs are divided into three types of requirements: chemical specific; location specific; and action specific. This distinction is based on the factors that trigger the requirement (e.g.,

emission of a chemical or particular action such as transportation of a chemical). These types of ARARs are defined as follows:

- Chemically Specific Requirements are set health or risk-based concentration limits or ranges in various environmental media for specific hazardous substances, pollutants or contaminants that is acceptable in the ambient environment. Examples of chemical specific ARARs are National Ambient Water Quality Standards.

- Location Specific Requirements are set restrictions on activities, depending on the characteristics of a site or its immediate receptors. A remedial alternative may be restricted or eliminated due to the location or characteristics of the site and the requirements that apply to it. Examples of location specific ARARs are regulations based on proximity to wetlands and flood plains.

- Action Specific Requirements are set controls or restrictions on particular kinds of activities related to the management of hazardous substances, pollutants or contaminants. These requirements are not triggered by specific chemicals at a site, but rather by the particular activities to be conducted during the implementation of the remedial alternative (technology or activity-based requirements). Examples of action specific ARARs are transportation and handling requirements.

Only chemical specific ARARs are candidates for site cleanup goals. Action specific and location-specific ARARs apply to the execution of the selected remedial alternative.

Identification of Federal ARARs for the S.E. Rockford Site

This section presents a summary of those federal regulations that may be found to be applicable or relevant and appropriate to the S.E. Rockford site, specifically:

- Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), including the Superfund Amendments and Reauthorization Act (SARA) of 1986, the Small Business Liability Relief and Brownfields Revitalization Act of 2002 and subsequent amendments;

- Resource Conservation and Recovery Act of 1996, as amended (RCRA);

- Hazardous and Solid Waste Act Amendments of 1984 (HSWA);

- The Clean Water Act (CWA) and Amendments;

- The Safe Drinking Water Act (SDWA);

- The Clean Air Act (CAA);

- The National Environmental Policy Act of 1969 (NEPA); and

- The Hazardous Materials Transportation Act.

The Comprehensive Environmental Response, Compensation and Liability Act
CERCLA, last amended in January 2002, provides the U.S. EPA Administrator the authority to respond to any past disposal of hazardous substances and any new uncontrolled releases of hazardous substances. Within CERCLA, a trust fund has been established for cleanup of abandoned past disposal sites and leaking underground storage facilities, as well as the authority to bring civil actions against violators of this act. The National Contingency Plan (NCP), which guides removal and remedial actions at Superfund sites, was developed subject to this act. The Superfund Amendments and Reauthorization Act (SARA) of 1986 extensively amended CERCLA. The major goals of SARA were to include more public participation, and to establish more consideration of State clean-up standards, with an emphasis on achieving remedies that permanently and significantly reduce the mobility, toxicity, or volume of wastes.

The Resource Conservation and Recovery Act
RCRA regulates the management and land disposal of hazardous waste and solid waste material and the recovery of materials and energy resources from the waste stream. RCRA regulates the generation, transportation, treatment, storage and disposal of hazardous wastes, as well as solid waste disposal facilities. RCRA applies to remedial actions that include disposal, treatment, storage or transportation of regulated wastes. Remedies that include on-site disposal of hazardous wastes will be required to meet RCRA design, monitoring, performance, e.g., air emission standards 35 Ill. Adm. Code 724, and closure standards. Off-site transportation of regulated wastes, whether as part of a remedial action or as generated during the investigation, will require use of the manifest system, a RCRA-licensed transporter and proof of acceptance at a licensed facility approved for the particular wastes.

The Hazardous and Solid Waste Act Amendments
The Hazardous and Solid Waste Act Amendments (HSWA) of 1984 impose new and more stringent requirements on hazardous waste generators, transporters, and owner/operators of treatment, storage, and disposal facilities. Land disposal restrictions, as described in 40 CFR 268, identify hazardous wastes that are restricted from land disposal and define those limited circumstances under which an otherwise prohibited waste may continue to be land disposed.

The Clean Water Act
The Federal Water Pollution Control Act, amended by the Clean Water Act of 1977, was last amended October 1992, and is commonly referred to as the Clean Water Act (CWA). Federal Ambient Water Quality Criteria documents have been published for 65 priority pollutants listed as toxic under the CWA. These criteria are guidelines that may be used by states to set surface water quality standards. Although these criteria were intended to represent a reasonable estimate of pollutant concentrations consistent with the maintenance of designated water uses, states may appropriately modify these values to reflect local conditions. Under SARA, however, remedial actions must attain a level or standard of control that will result in surface water conditions equivalent to these criteria, unless a waiver has been granted.

The water quality criteria are generally represented in categories that are aligned with different surface water-use designations. These criteria represent concentrations that, if not exceeded in surface water, should protect most aquatic life against acute or chronic toxicity. For many

chemical compounds, specific criteria have not been established because of insufficient data. The criteria are used to calculate appropriate limitations for discharges to surface water. These limitations are incorporated in the National Pollutant Discharge Elimination System (NPDES) permits.

The provisions of the CWA are potentially applicable to uncontrolled landfill leachate and groundwater discharges to surface water bodies and to remedial actions that include a discharge of treated water to surface water.
Appendix A of 40 CFR Part 6 describes the requirements for flood plain/wetlands review of proposed U.S. EPA actions. These regulations are potentially applicable for work to be done in the creeks or other wetland areas, and for remedial activities within the flood plain, such as the unnamed creek in Area 7.

The Safe Drinking Water Act
The Safe Drinking Water Act of 1974 (SDWA) regulates the quality of water collected, distributed or sold for drinking purposes. Standards are set for MCLs permissible in water delivered to any user of public drinking water. The SDWA also has been broadened to protect groundwater and public drinking water supplies against contamination.

National primary drinking water standards established under the SDWA are promulgated as MCLs that represent the maximum allowable levels of specific contaminants in public water systems. MCLs are generally based on lifetime exposure to the contaminant for a 70 kg (154 pound) adult who consumes two liters (0.53 gallons) of water per day.

The SDWA provides for primary drinking water regulations to be established for maximum contaminant level goals (MCLGs), with MCLs as close to MCLGs as feasible. MCLGs are non-enforceable health goals at which no known or anticipated adverse effects on the health of persons would be expected to occur, thus allowing an adequate margin of safety. MCLGs only serve as goals for U.S. EPA in the course of setting MCLs and, therefore, are initial steps in the MCL rule-making process.

MCLs and MCLGs for contaminants of concern at the SCOU are established in the final Risk Assessment (CDM 1998).

The Clean Air Act
The Clean Air Act, as amended (CAA), was enacted to protect and enhance the quality of air resources to protect public health and welfare. The CAA is intended to initiate and accelerate national research and development programs to achieve the prevention and control of air pollution. Under the CAA, the Federal Agencies are to provide technical and financial assistance to state and local governments for the development and execution of their air pollution programs. The U.S. EPA is the administrator of the Act and is given the responsibility to meet the objectives of the Act. The Act establishes emission levels for certain hazardous air pollutants that result from treatment processes.

Requirements of the CAA are potentially applicable to remedial actions that result in air emissions, such as excavation and treatment activities.

The Hazardous Materials Transportation Act

The Hazardous Materials Transportation Act (HMTA) of 1981, as amended, was enacted to regulate the shipping, marking, labeling, and placing of hazardous materials that are transported on public roadways. Pursuant to the HMTA, the Department of Transportation (DOT) has promulgated regulations pertaining to transportation of hazardous materials. DOT also has jurisdiction over the packaging of hazardous materials prior to shipment.

Hazardous soils, residues, wastewaters, or wastes that are transported off-site from the SCOU site will be handled according to HMTA and DOT regulations.

Identification of State ARARs for the S.E. Rockford SCOU

The purpose of this section is to identify ARARs that exist based on Illinois state regulations that must be complied with when performing a remedial action. The agency charged with developing and enforcing environmental regulations for Illinois is the Illinois EPA, in conjunction with the Illinois Pollution Control Board. Specifically, these potential ARARs include:

- Illinois Groundwater Protection Act
- Illinois Solid Waste Management Rules; and
- Illinois Air Pollution Control Regulations

Illinois Groundwater Protection Act

The Illinois Groundwater Protection Act (IGPA) was enacted on November 7, 1991 (amended in 1994) by the Illinois General Assembly (IGA) as an outgrowth of long-standing concern by the IGA and the citizens of Illinois that the State's rich and valued groundwater resources be protected. The IGPA is a multi-faceted groundwater policy and program statement designed to provide such protection and to assure the continued viability of the State's groundwater resources. In order to restore, protect, enhance and manage the groundwater of Illinois, the IGPA proposes regulations that establish comprehensive water quality standards specifically for the protection of groundwater.

Groundwater impacted by activities at the SCOU will be compared to the Illinois groundwater quality standards to determine the need for corrective actions, if any. The IGPA is incorporated into the Illinois Administrative Code in Title 35, Subtitle F (Public Water Supplies), Part 620 Groundwater Quality; groundwater quality standards are given in Subtitle D of this Part 620.

Illinois Water Quality Standards (35 Ill. Adm. Code Subtitle C: Water Pollution and Subtitle F: Public Water Supplies)

These regulations pertain to all waters in the state and are intended to restore and maintain the chemical, physical and biological integrity of the waters of the state. The regulations include:

- Specific water quality standards and minimum treatment requirements that apply to all waters of the state (see Subtitle C: Part 302 water quality standards). These include minimum surface water quality standards, effluent standards and general use water quality standards.

- Regulations applying to industrial wastewater programs (National Pollutant Discharge Elimination System – NPDES);

- Water quality standards for water distributed through public water supply systems (Subtitle F, specifically). These include primary drinking water standards and groundwater monitoring requirements; and

- Groundwater quality standards for Class I-IV groundwater (defined in Subtitle F: Part 620) with potential for use in public water supply systems.

The procedures for developing water quality criteria based on toxicity are included in Ill. Adm. Code Subtitle C: Part 302, Subpart F, as are procedures for evaluating the characteristics of receiving waters. These procedures are used to determine discharge concentrations, which if not exceeded, will maintain the quality of the receiving waters. Note that Subpart F: Section 620.130 exempts groundwater from the General Use Standards or Public and Food Processing Standards of Subparts B and C of 35 Ill. Adm. Code 302. It is the purpose of all of the mentioned water quality regulations to meet the requirements of Section 402 of the Federal Clean Water Act (CWA).

Illinois Solid Waste Management Rules (35 Ill. Admin. Code Subtitle G: Waste Disposal)
These regulations specify requirements that apply to solid waste and hazardous waste facilities. These include solid waste management requirements, hazardous waste management permitting and related hazardous waste operations requirements. The solid waste regulations are given specifically under Subchapter I: Solid Waste and Special Waste Handling, Parts 807-880. These regulations include design and disposal regulations as well as monitoring requirements and standards for groundwater protection applicable to solid waste and special waste landfills. The hazardous waste regulations were developed pursuant to the requirements of RCRA and are given specifically in Parts 700-750 of Subtitle G. These hazardous waste regulations pertain to generators and transporters of hazardous waste and owners or operators of hazardous waste facilities. Regulations regarding Underground Injection Control (UIC) and the handling of Universal Wastes are also included in this section.

Illinois Air Pollution Control Regulations (35 Ill. Admin. Code Subtitle B: Air Pollution)
The Illinois air pollution control regulations were developed pursuant to the Federal Clean Air Act (CAA). The regulations contain specific emission levels and requirements for monitoring emissions. They contain regulations for specific types of operations (such as burning) and types of industry as well as permitting requirements. There are also specific emissions standards for hazardous air pollutants. Subchapter F, Part 232 provides information regarding toxic air contaminants and Subchapter L, Part 243 of these regulations give Air Quality Standards.

IDENTIFICATION OF ARARs

The regulatory groups previously described were considered during the ARAR identification process. This includes federal and state requirements (applicable or relevant and appropriate). Other information to be considered (TBCs) include federal and state criteria, advisories and guidance documents. The identification of ARARs presented in this section was based on current knowledge of the site, available analytical data and review of ARARs established for sites with similar contamination. The ARARs from other sites were derived by reviewing EPA RODs from sites both within and outside of Region V, based on selected remedial alternatives and final ARARs chosen for these sites.

Table 35 provides a summary of potential ARARs at the SCOU. Based on the anticipated remedial actions at the site, some of these potential ARARs may not apply and are marked in the last column of Table 35. The ARARs that will apply have a direct effect upon the remedial actions selected. The following paragraphs discuss some examples of this direct effect.

NPDES, Illinois Underground Injection Control (UIC) and Illinois Air Emission Source Construction permits can be obtained, but may take considerable lengths of time. The Illinois EPA Division of Air Pollution Control will require off-gas containment of any air stripper that exceeds a total volatile emission rate of 8 pounds per hour. Any groundwater that is remediated will require treatment to MCLs or IGWPA levels, whichever is more stringent; or to NPDES discharge levels, depending on the discharge option selected. MCLs and IGWPA Class I Groundwater Standards for all VOCs that exceed MCLs in groundwater are provided in tables in this ROD.

The IGWPA was set up in 1987 to respond to the need to manage groundwater quality by prevention-oriented processes. It establishes comprehensive water quality standards for groundwater, provides for the use of water well protection zones and allows for the establishment of groundwater management zones (GMZs) within any class of groundwater. A GMZ can be established where groundwater is being managed to mitigate against effects caused by the release of contaminants from a site. GMZ provisions recognize the practical limitations commonly associated with remediating groundwater contamination and links technological approaches and practices with standards regulation. The area of a GMZ can be established with reference to a given point of compliance and an appropriate period of time to achieve compliance. The groundwater within the study area is considered Class I groundwater, under the definitions provided by the Act.

Publicly Owned Treatment Works (POTWs) are designated to treat domestic wastewater or sewage. In general, POTWs are not designated to treat heavy metals, solvents, organics and other types of toxic pollutants. POTWs are certainly not for off-site treatment or disposal of contaminated groundwater. The treatment of toxic pollutants, if it occurs at all in a POTW treatment plant, is incidental to the design of most POTWs and involves, to a large extent, taking advantage of the treatment system's ability to dilute non-domestic or industrial discharges, as well as adsorption of toxic pollutants to particles that settle out into the sludge. Thus, a significant portion of the heavy metals and organic compounds that are introduced into the head-works of a POTW treatment plant end up in the POTWs sewage sludge. Therefore, this ROD has assumed that discharge to the POTW is not acceptable, unless appropriate pre-treatment steps

were taken. It is noted that the local POTW has indicated that it would not accept any contaminated leachate collected from the SCOU.

Illinois EPA Bureau of Water regulations governing the construction and operation of treatment units are found at 35 Ill. Adm. Code Sections 302, 304, and 309. Section 302 contains water quality standards, Section 304 contains effluent limitations and Section 309 deals with permitting requirements.

The construction of a groundwater treatment system in most cases requires a permit from the Bureau of Water. A burden of proof is placed upon the permittee to justify that the proposed treatment system is capable of meeting either the surface water discharge standards or general pretreatment standards for discharge to a sanitary sewer. It is also required that the selected remedy is the correct technology and design specifications are correct for the contaminants of concern.

The National Pollutant Discharge Elimination System (NPDES) is utilized when a discharge is made to any surface water. The NPDES program provides for a non-degradation analysis of the receiving stream water quality analysis, and a review of the parameters of concern to determine the appropriate limits and monitoring requirements. Permit limits are derived from the more stringent applicable water quality standards, technology based effluent limits, and federal categorical limitations (not applicable in this case).

Air Strippers are part of the selected remedy for Source Areas 4 & 7 and have been determined by the Illinois EPA Bureau of Water to be an appropriate effective technology for the removal of VOCs. VOCs in both areas are the primary contaminants of concern, however, the effectiveness of the air-stripping system will be deferred until the design is completed and submitted.

A permeable reactive barrier wall was the proposed remedy for remediation of the leachate in Source Area 9/10. The Illinois EPA, however, modified the remedy used for leachate control in this area, based on additional data and analysis of the potential sources of contamination and public comment. The remedy will be designed to meet regulations of Public Water Supplies and 35 Ill. Adm. Code Part 620 Class I Groundwater Standards for potable water supplies.

Sampling requirements vary from site to site, however, a protocol that has worked well for remediation systems is to require more frequent initial monitoring. Once consistency is established, the frequency of sampling may be reduced. One method frequently used is to require weekly sampling during the first two months of operation, twice a month sampling during the next two months and finally monthly sampling thereafter. A shutdown of the system would require a return to weekly sampling for a period of time, before returning to the previous sampling frequency. Situations may call for a variance in the frequency of sampling, requiring more sampling following a period of shutdown. The additional sampling will allow for adjustments to be made in the establishment of system equilibrium.

Discharge Limits are based upon the most up-to-date information gathered for the parameters of concern. Table 34 includes both aquatic toxicity and human-health-based criteria. In most cases, the AATC (acute criteria) is used as the daily maximum quality-based limit. In some rare cases,

a human-health-based limit may be used as the monthly average limit, depending on the potential for longer-term exposure. Discharge would be to a storm ditch, which would most likely be a zero low flow stream and therefore, water quality criteria would apply at the end of the pipe and would be the permit limits.

Table 34. Discharge Limits

Parameter	Acute Criteria	Chronic Criteria	Human Health
1,1 dichloroethylene	3000 ug/l	240 ug/l	0.95 ug/l
1,2-dichloroethylene	14 mg/l	1.1 mg/	-
ethyl benzene	210 ug/l	17 ug/l	9.3 mg/l
tetrachloroethylene	1.2 mg/l	0.15 mg/l	2.8 ug/l
toluene	2000 ug/l	230 ug/l	62 mg/l
1,1,1-trichloroethane	4900 ug/l	390 ug/l	-
1,1,2-trichloroethane	19 mg/l	4.4 mg/l	12 ug/l
trichloroethylene	12 mg/l	0.94 mg/l	25 ug/l
xylenes	0.92 mg/l	0.073 mg/l	62 mg/l

Note: Technology based (BAT) limits are normally used for Benzene (0.05 mg/l) and Total BTEX (benzene, ethylbenzene, toluene, and xylenes) (0.75 mg/l).

Table 35
Summary of ARARS
Southeast Rockford SCOU Focused Feasibility Study

Act/Regulation	Federal or State	Type of ARAR	Parameter/ Program	Description	Probably Will Not Apply
Action Specific					
Air Pollution Emission Control Regs. (63)	S	Action	Air emission	Permit required for all emissions. Requires control of off-gas if emission > 8 lbs/hr	
Air - Pollution Control Board (64)	S	Action	Air emission	No person shall cause or threaten or allow the discharge or emission of any contaminant	
Air - Pollution Control Board (65)	S	Action	Air emission	Regulates particulate matter emissions	
CWA(50)	F/S	Action	NPDES	Discharge permit required (to Rock River)	
CWA/RCRA (49-51)	F/S	Action	POTW	Regulates discharge to POTW	X
CWA(49)	F	Action	NPDES	POTW pre-treatment standards relating to Superfund site leachate	
CWA(56)	F	Action	NPDES	Establishes Water Quality Based Effluent Limitations	
CWA(50)	F	Action	National pre-treatment standards	Discharge to POTW restrictions	
CWA(51)	F/S	Action	National pre-treatment standards	National pre-treatment program requirements for POTWs	
CAA(34)	F	Action	Air quality	Sets max. primary and secondary 24-hour particulate concentrations	
CWA(52)	F/S	Action	NPDES	Permit must include proposed action and list all other permits	
CWA(53)	F/S	Action	NPDES	Establish standards, limitations and other	

				conditions	

Table 35 Continued
Summary of ARARS
Southeast Rockford SCOU Focused Feasibility Study

CWA(54)	F	Action	NPDES	BAT for toxic and non-conventional wastewater or BCT for conventional	
CWA(61)	F	Action	Env. sampling	Requires adherence to sample preservation, container type, and holding times	
CWA(56)	F/S	Action	NPDES	Effluent limitations and standards; permit requirements for discharge to storm sewer	
CWA(57)	F/S	Action	NPDES	Establish discharge limits for toxins exceeding BAT/BCT standards	
CWA(60)	F/S	Action	Surface water	States granted enforcement jurisdiction over discharges to surface waters	
CWA(58)	F/S	Action	NPDES	Requires monitoring to ensure compliance	
DOT(36)	F	Action	Haz. mat. transportation	Procedures for packaging, labeling and transportation of hazardous materials	
Fish and Wildlife Coordination Act(62)	F	Action	Surface Water	Any fed. agency must consult U.S. Fish and Wildlife if a surface water body is modified	
Noise Control Act(37)	F	Action	Construction noise emission standards	Sets standards for construction noise emissions	
Protection of Archeological Resources(38)	F	Action	Archeological resource protection	Procedures for archeological resource protection	X
RCRA	F/S	Action	UIC	Regulates injection of groundwater	X
RCRA(48)	F/S	Action	T & D standards	Interim storage or treatment of haz. waste in containment buildings	

Table 35 Continued
Summary of ARARS
Southeast Rockford SCOU Focused Feasibility Study

RCRA(47)	F/S	Action	T & D standards - haz waste storage	Standards for haz. waste storage in containers, surface impoundments and landfills	
RCRA(46)	F/S	Action	T & D standards	Requirements for closure and post-closure of haz. waste facilities	
RCRA(45)	F/S	Action	T & D standards - groundwater	Requirements for groundwater monitoring program	
RCRA(44)	F/S	Action	T & D standards	Sets standards for T & D facility storage and treatment, design, emergency and preparedness plans	
RCRA(43)	F/S	Action	UST regs.	Sets requirements for UST closure	
RCRA(42)	F/S	Action	RCRA land disposal restriction	Defines haz. waste debris and applies to wastes disposed off-site	
RCRA(41)	F/S	Action	T & D standards	Sets requirements for haz. waste man. unit closure	
RCRA(40)	F/S	Action	Haz. waste transport and disposal (T & D)	Sets standards for haz. waste generators and transporters	
RCRA(39)	F/S	Action	Land disposal of solid waste	Solid, nonhaz. remediation derived waste disposal procedures	
UIC Regulations (72-74)	S	Action	UIC	Permit and controls required	
Illinois Groundwater Protection Act (79)	S	Action/ Chemical	Groundwater	Establishes groundwater management zones	
RCRA (69)	F/S	Action/ Chemical	Spent Carbon	Manifest/Transport/ Regenerate Spent Carbon	
Chemical Specific					
CAA(1)	F	Chemical	Air emission	Sets regs. On national primary and secondary air quality standards	

Table 35 Continued
Summary of ARARS
Southeast Rockford SCOU Focused Feasibility Study

CWA(2)	F/S	Chemical	Water quality	Establishes water quality standards	
Air - Pollution Control Board(8)	S	Chemical	Air permits and provisions	Lists provisions for new sources requiring permits	
Air - Pollution Control Board(9)	S	Chemical	Air permits and provisions	Defines emission sources and sets limitations	
Air - Pollution Control Board(10)	S	Chemical	Air permits and provisions	Sets air quality standards and measurement methods for lead, CO, nitrogen and sulfur oxides	
Air - Pollution Control Board(11)	S	Chemical	Air permits and general provisions	Sets provisions and procedures for id. and evaluating toxic air contaminants	
Air - Pollution Control Board (12)	S	Chemical	Air emissions	VOM emissions limited to <20 ppm	
Air - Pollution Control Board (13)	S	Chemical	Air emissions	CO emissions from incinerators limited to <500 ppm	
CAA (1)	F	Chemical	VC	VC emissions limited to <10 ppm	
Public Water Supplies Poll. Control Board(20)	S	Chemical	Primary Drinking Water Standards	MCLs, primary drinking water standards, analytical requirements	
Public Water Supplies Poll. Control Board(19)	S	Chemical	Illinois Groundwater Quality	Illinois groundwater quality standards, class designations	
SDWA (3)	F	Chemical	MCLs	Sets MCLs for public drinking water	
RCRA(5)	F/S	Chemical	Solid Waste	Sets criteria for identifying haz. waste	
RCRA(4)	F/S	Chemical	Solid waste	Sets treatment standards for waste extract incl. hazardous waste	
RCRA(6)	F/S	Chemical	Solid Waste	Identifies charac. of haz. waste	
RCRA(7)	F/S	Chemical	Solid Waste	List of haz. waste from sources	

Table 35 Continued
Summary of ARARS
Southeast Rockford SCOU Focused Feasibility Study

Waste Disposal - Pollution Control Board(76)	S	Chemical	Solid waste and special waste hauling	Solid waste permitting, san. landfill closure and post-closure, and waste classification	
Waste Disposal - Pollution Control Board(16)	S	Chemical	Hazardous waste landfill disposal	Describes haz. waste restrictions on halogenated solvents and liquid wastes	
Waste Disposal - Pollution Control Board(17)	S	Chemical	Hazardous waste lists and criteria	Solid waste permitting, sanitary landfills, closure & post closure care, and special waste classifications	
Waste Disposal - Pollution Control Board(14)	S	Chemical	Hazardous waste lists and criteria	Identifying and listing hazardous waste (includes PCB wastes under TSCA)	
Waste Disposal - Pollution Control Board(15)	S	Chemical	Hazardous waste landfill disposal	Defines landfill waste disposal restrictions, treatment standards and prohibitions	
Water - Pollution Control Board(19)	S	Chemical	Effluent Standards	General and temp. effluent standards incl. NPDES	
Water - Pollution Control Board(18)	S	Chemical	Water Quality Standards	Water quality criteria, public and food processing water supply	X
Location Specific					
CWA(22)	F	Location/Action	Wetland dredge and fill permits	Requires no wetland alteration if practical alternative available	X
Air - Pollution Control Board(30)	S	Location	Air emissions standards	Distinguishes air emission standards for Chicago and Metro East Area	
Air - Pollution Control Board(29)	S	Location	Construction permitting	Application for construction and operating permits including review	X
Fish and Wildlife Coordination Act(23)	F	Location	Water body modification	Any federal agency must consult U.S. Fish and Wildlife prior to water body modification	

Table 35 Continued
Summary of ARARS
Southeast Rockford SCOU Focused Feasibility Study

Flood Control Act(27)	F	Location	Flood plain construction	Req. approval for any construction in floodway outside Superfund boundary	
NEPA(25)	F	Location	Floodplain Management	Req. fed. agencies to mitigate flooding and preserve flood plains	
NEPA(24)	F	Location	Protection of Wetlands	Requires federal agencies to minimize degradation and preserve wetlands	
RCRA(27)	F/S	Location	100 year floodplain	Controls type of construction in 100 year floodplain	X
Waste Disposal - Pollution Control Board(31)	S	Location	RCRA permit	RCRA permit application rules, applicability and information	
Water - Pollution Control Board(33)	S	Location	NPDES and water related permitting	Includes NPDES permit provisions and other water related permitting	
Water - Pollution Control Board(32)	S	Location	Water use and site specific standards	Establishes site specific water quality standards in Illinois	

COST EFFECTIVENESS

The types of costs that will be assessed include the following:

- Capital costs, including both direct and indirect costs;
- Annual operation and maintenance costs (O&M);
- Cost of periodic replacement of system components; and
- Net present value of capital and O&M costs based on a 30-year period.

Capital costs consist of direct (construction) and indirect (non-construction and overhead) costs. Direct costs include expenditures for the equipment, labor, and materials necessary to install remedial actions. Indirect costs include expenditures for engineering, financial and other services that are not part of actual installation activities, but are required to complete the installation of remedial alternatives. A bid contingency of 10 to 15 percent, a scope contingency based on the level of difficulty to implement the alternative and costs for engineering design and implementation of the alternative were included as indirect costs.

Annual operation and maintenance costs are post-construction costs necessary to ensure the continued effectiveness of a remedial action. Periodic replacement costs are necessary when the anticipated duration of the remediation exceeds the design life of the system component.

A present worth analysis is used to evaluate expenditures that occur over different time periods, by discounting all future costs to a common base year, usually the current year. A discount rate of seven percent was used for the present worth analysis. This allows the cost of remedial action alternatives to be compared on the basis of a single figure representing the amount of money that, if invested in the base year and disbursed as needed, would be sufficient to cover all costs associated with the remedial action over its planned life. The total present worth costs presented in this section were estimated as accurately as possible, but were prepared for comparative purposes only. The actual costs for each alternative may change upon detailed design and implementation, but the overall cost difference of one alternative relative to another should not vary significantly.

CHEMICAL SPECIFIC REQUIREMENTS

Federal

(1) Clean Air Act (42 U.S.C. §§ 7401 et seq.), National Primary and Secondary Ambient Air Quality Standards (40 CFR 50), U.S. EPA regulations on National Primary and Secondary Ambient Air Quality Standards.

(2) Clean Water Act (33 U.S.C. §§ 1251 et seq.), Water Quality Standards (40 CFR 131), U.S. EPA regulations on establishing water quality standards.

(3) Safe Drinking Water Act (42 U.S.C. §§ 300f et seq.), Maximum Contaminant Levels (40 CFR 141.11 - 141.16), sets standards for contaminants in public drinking water supplies.

(4) Solid Waste Disposal Act, as amended (42 U.S.C. §§ 6901 et seq.), Land Disposal Restrictions (40 CFR 268) Subpart D, Treatment Standards, sets the treatment standards for waste extract, specified technology and hazardous waste debris.

(5) Solid Waste Disposal Act, (42 U.S.C. §§ 6901 et seq.), Identification and Listing of Hazardous Waste (40 CFR 261) Subpart B, Criteria for Identifying the Characteristics of Hazardous Waste and for Listing Hazardous Waste, sets criteria for identifying a hazardous waste.

(6) Solid Waste Disposal Act, (42 U.S.C. §§ 6901 et seq.), Identification and Listing of Hazardous Waste (40 CFR 261) Subpart C, Characteristics of Hazardous Waste, identifies the characteristics of a hazardous waste.

(7) Solid Waste Disposal Act, (42 U.S.C. §§ 6901 et seq.), Identification and Listing of Hazardous Waste (40 CFR 261) Subpart D, List of Hazardous Waste, list of hazardous waste from sources.

State

(8) Air – Illinois Environmental Protection Act, Section 9 (415 ILCS 5/9), Pollution Control Board (Title 35), Subtitle B - Subchapter A, Part 201: Permits and General Provisions, lists general provisions for new sources requiring permitting. Exemptions from permit requirement are also given.

(9) Air - Illinois Environmental Protection Act, Section 9 (415 ILCS 5/9), Pollution Control Board (Title 35), Subtitle B - Subchapter C Emission Standards and Limitations for Stationary Sources, Part 211: Definitions and General Provisions, defines emission sources and related items; Part 212 Visible and Particulate Matter Emissions sets emission limitations for particulate matter for a variety of operations, i.e., incinerators or waste storage piles. Also see Parts 214-219, which gives information regarding specific types of emissions per operation e.g., sulfur, organic material, carbon monoxide and nitrogen oxide emissions.

(10) Air - Illinois Environmental Protection Act, Section 9 (415 ILCS 5/9), Pollution Control Board (Title 35), Subtitle B - Subchapter L, Part 243: Air Quality Standards, sets air quality standards and measurement methods for PM-10, particulates, sulfur oxides, carbon monoxide, nitrogen oxides, ozone and lead.

(11) Air - Illinois Environmental Protection Act, Section 9 (415 ILCS 5/9), Pollution Control Board (Title 35), Subtitle B - Subchapter F, Part 232: Toxic Air Contaminants, sets provisions and procedures for identifying and evaluating toxic air contaminants; exceptions are also given here.

(12) Air - Illinois Environmental Protection Act, Section 9 (415 ILCS 5/9), Pollution Control Board (Title 35), Subtitle B – Air Pollution, Part 215: Organic Material Emissions Standards and Limitations, sets emission standards for volatile organic material for a variety of operations.

(13) Air - Illinois Environmental Protection Act, Section 9 (415 ILCS 5/9), Pollution Control Board (Title 35), Subtitle B – Air Pollution, Part 216: Carbon Monoxide Emissions, sets emission standards for carbon monoxide for a variety of operations.

(14) Waste Disposal - Illinois Environmental Protection Act, Section 21 (415 ILCS 5/21), Pollution Control Board (Title 35), Subtitle G - Subchapter C: Hazardous Waste Operating Requirements, Part 721: Identification of Listing of Hazardous Waste, includes

PCB wastes regulated under TSCA, universal wastes, criteria for identifying and listing hazardous waste, and lists of hazardous waste.

(15) Waste Disposal - Illinois Environmental Protection Act, Section 21 (415 ILCS 5/21), Pollution Control Board (Title 35), Subtitle G - Subchapter C: Hazardous Waste Operating Requirements, Part 728: Land Disposal Restrictions, defines land disposal restrictions for wastes, waste specific prohibitions, treatment standards, and prohibitions on storage.

(16) Waste Disposal - Illinois Environmental Protection Act, Section 21 (415 ILCS 5/21), Pollution Control Board (Title 35), Subtitle G - Subchapter C: Hazardous Waste Operating Requirements, Part 729: Prohibited Hazardous Wastes in Land Disposal Units, describes general hazardous waste restrictions and restrictions on halogenated solvents and liquid hazardous wastes in landfills.

(17) Waste Disposal - Illinois Environmental Protection Act, Section 21 (415 ILCS 5/21), Pollution Control Board (Title 35), Subtitle G - Subchapter I: Solid Waste and Special Waste Hauling, Part 807 includes information on solid waste permitting, sanitary landfills and closure and post-closure care; Part 808 includes information on special waste classifications.

(18) Water - Illinois Environmental Protection Act, Section 12 (415 ILCS 5/12), Pollution Control Board (Title 35), Subtitle C - Part 302: Water Quality Standards, provisions and water quality standards for general use, public and food processing water supply, secondary contact and indigenous aquatic life and Lake Michigan. Procedures for determining Water Quality Criteria are also in this Part.

(19) Water - Illinois Environmental Protection Act, Section 12 (415 ILCS 5/12), Pollution Control Board (Title 35), Subtitle C - Part 304: Effluent Standards, general and temporary effluent standards including NPDES effluent standards.

(20) Public Water Supplies - Illinois Environmental Protection Act, Section 14 (415 ILCS 5/14), Pollution Control Board (Title 35), Subtitle F - Part 611: Primary Drinking Water Standards, includes provisions of the primary drinking water standards as well as maximum contaminant levels (MCLs)/goals, and analytical requirements.

(21) Public Water Supplies - Illinois Environmental Protection Act, Section 14 (415 ILCS 5/14), Pollution Control Board (Title 35), Subtitle F - Part 620: Groundwater Quality, includes Illinois groundwater quality standards as well as definition of groundwater class designations.

Location-Specific Requirements

Federal

(22) Clean Water Act, (33 U.S.C. §§ 1251 et seq.), Permits for Dredge or Fill Material (Section 404), requires that no activity that adversely affects a wetlands shall be permitted if a practicable alternative that has less effect is available.

(23) Fish and Wildlife Coordination Act (16 U.S.C. §§ 661 et seq.), requires that any federal agency that proposes to modify a body of water must consult U.S. Fish and Wildlife Services.

(24) National Environmental Policy Act (42 U.S.C. § 4321) Executive Order 11990, Protection of Wetlands, requires federal agencies to minimize the destruction, loss, or degradation of Wetlands and preserve.

(25) National Environmental Policy Act (42 U.S.C. § 4321) Executive Order 11988, Floodplain Management, requires federal agencies to reduce the risk of flood loss, to minimize impact of floods, and to restore and preserve the natural and beneficial value of flood plains.

(26) National Environmental Policy Act (42 U.S.C. § 4321) Statement of Procedures on Floodplain Management and Wetland Protection (40 CFR 6) Appendix A to Part 6, promulgates Executive Orders 11988 and 11990 regarding wetlands and flood plains.

State

(27) Flood Control Act (ILCS 14-28-1), requires formal approval for any construction, excavation or filling in the floodway outside of the Superfund boundary.

(28) Water Resources Management Act (ILCS-14-25-7), requires registration of any significant water withdrawal facility with the Department of Natural Resources. A significant water withdrawal facility is defined as any water withdrawal facility that, in the aggregate from all sources and by all methods, has the capacity to withdraw more than 100,000 gallons of groundwater or surface water or a combination of the two in one day. This would also include any potable pumps employed by the facility.

(29) Air - Illinois Environmental Protection Act, Section 9 (415 ILCS 5/9), Pollution Control Board (Title 35), Subtitle B - Subchapter A, Part 201, Subpart D: Permit Application and Review Process, describes contents of the application for construction and operating permits and the review process.

(30) Air - Illinois Environmental Protection Act, Section 9 (415 ILCS 5/9), Pollution Control Board (Title 35), Subtitle B - Subchapter C Emission Standards and Limitations for Stationary Sources, Part 218: Organic Material Emission Standards and Limitations for the Chicago Area; Part 219: Organic Material Emission Standards for the Metro East Area, distinguishes emission standards for the Chicago Area and the Metro East Area - see detailed regulation for applicability to the S.E. Rockford site.

(31) Waste Disposal - Illinois Environmental Protection Act, Section 21 (415 ILCS 5/21), Pollution Control Board (Title 35), Subtitle G - Subchapter B: Permits, Part 703: RCRA Permit Program, rules on application for and issuance of RCRA permits; applicability and information requirements.

(32) Water - Illinois Environmental Protection Act, Section 12 (415 ILCS 5/12), Pollution Control Board (Title 35), Subtitle C - Part 303: Water Use Designations and Site Specific Water Quality Standards, provisions and site specific water quality standards for water bodies throughout Illinois.

(33) Water - Illinois Environmental Protection Act, Section 12 (415 ILCS 5/12), Pollution Control Board (Title 35), Subtitle C - Part 309: Permits, Subpart A includes provisions for NPDES permits and Subpart B includes provisions for all other water related permitting.

ACTION-SPECIFIC REQUIREMENTS

Federal

(34) Clean Air Act, (42 U.S.C. §§ 7401 et seq.), National Primary and Secondary Ambient Air Quality Standards (40 CFR Part 50), specifies maximum primary and secondary 24-hour concentrations for particulate matter.

(35) Clean Water Act, (33 U.S.C. §§ 1251 et seq.), Permits for Dredge or Fill Material (Section 404), provides requirements for discharges of dredged or fill material. Under this requirement, no activity that affects a wetland shall be permitted if a practicable alternative that has less impact on the wetland is available. If there is no other practicable alternative impacts must be mitigated. A Section 401 water quality certification may be required from Illinois EPA if wetlands or other waters of the state are impacted.

(36) Department of Transportation Rules for Transportation of Hazardous Materials, (49 CFR Parts 107, 171.1 - 171.5), outlines procedures for the packaging, labeling, and transporting of hazardous materials.

(37) Noise Control Act, as amended (42 U.S.C. §§ 4901 et seq.); Noise Pollution and Abatement Act (40 U.S.C. §§ 7641 et seq.), Noise Emission Standards for Construction Equipment (40 CFR 204), the public must be protected from noise that jeopardizes health and welfare.

(38) Protection of Archeological Resources (32 CFR Part 229, 229.4; 43 CFR Parts 107, 171.1 - 171.5), develops procedures for the protection of archeological resources.

(39) Solid Waste Disposal Act, as amended (42 U.S.C. §§ 6901 et seq.), Guideline for the Land Disposal of Solid Wastes (40 CFR 241), Part B - Requirements and Recommended Procedures, solid, nonhazardous wastes generated as a result of remediation must be managed in accordance with federal and state regulations; this is applicable to waste generated by the remedial action.

(40) Solid Waste Disposal Act, as amended (42 U.S.C. §§ 6901 et seq.), Standards for Hazardous Waste Generators (40 CFR 262) and Standards for Hazardous Waste Transporters (40 CFR 263); general requirements for packaging, labeling, marking, and manifesting hazardous wastes for temporary storage and transportation offsite. Any residues determined to be RCRA hazardous waste destined for offsite disposal are subject to manifest requirements. Remedial actions involving offsite disposal of RCRA listed wastes will be subject to this requirement.

(41) Solid Waste Disposal Act, as amended (42 U.S.C. §§ 6901 et seq.), Interim Status Standards for Owners and Operators of Hazardous Waste Treatment Storage and Disposal Facilities (40 CFR 265), Storage, and Disposal General Facility Standards, Subpart G, Closure and Post-closure, sets general requirements for closure of interim status hazardous waste management units.

(42) Solid Waste Disposal Act, as amended (42 U.S.C. §§ 6901 et seq.), Land Disposal Restriction-RCRA (40 CFR 268), RCRA Land Disposal Restriction, defines hazardous waste debris. This requirement is applicable to those RCRA hazardous wastes that will be disposed offsite.

(43) Solid Waste Disposal Act, as amended (42 U.S.C. §§ 6901 et seq.), Technical Standards and Corrective Action Requirements for Owners and Operators of Underground Storage Tanks (40 CFR 280), Subpart G, Out-of-Service UST Systems and Closure, sets requirements for temporary and permanent UST closure, and assessing the site closure.

(44) Solid Waste Disposal Act, as amended (42 U.S.C. §§ 6901 et seq.), Standards for Owners and Operators of Hazardous Waste Treatment Storage, and Disposal Facilities (40 CFR 264), Subpart B, General Facility Standards; Subpart C, Preparedness and Prevention; Subpart D, Contingency Plan and Emergency Procedures; Subpart E, Manifest System, Record Keeping and Reporting, establishes general requirements for storage and

treatment facility location, design and inspection, waste compatibility determination, emergency contingency plans, preparedness plans, and worker training.

(45) Solid Waste Disposal Act, as amended (42 U.S.C. §§ 6901 et seq.), Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities (40 CFR 264) Subpart F, Releases from Solid Waste Management Units, details requirements for a groundwater monitoring program to be installed at the site.

(46) Solid Waste Disposal Act, as amended (42 U.S.C. §§ 6901 et seq.), Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities (40 CFR 264) Subpart G, Closure and Post-Closure, defines specific requirements for closure and post-closure of hazardous waste facilities.

(47) Solid Waste Disposal Act, as amended (42 U.S.C. §§ 6901 et seq.), Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities (40 CFR 264), Subpart I, Use and Management of Containers; Subpart J, Tank Systems; Subpart K, Surface Impoundments; Subpart L, Waste Piles; and Subpart N, Landfills. Containers, surface impoundments, and landfills used to store hazardous waste must be closed and in good condition. Tank systems must be adequately designed and have sufficient structural strength and compatibility with the wastes to be stored or treated to ensure that it will not collapse, rupture, or fail, including secondary containment. Waste piles must be designed to prevent migration of wastes out of the pile into adjacent subsurface soil or groundwater or surface water at any time during its active life. Disposal of special wastes in landfills must be done in accordance with requirements.

(48) Solid Waste Disposal Act, as amended (42 U.S.C. §§ 6901 et seq.), Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities (40 CFR 264), Subpart DD, Containment Building. Hazardous waste and debris may be placed in units known as containment buildings for the purpose of interim storage or treatment.

The following is a list of potential ARARs for Superfund sites that discharge treated groundwater to Publicly Owned Treatment Works (POTW):

(49) Clean Water Act, (33 U.S.C. §§ 1251 et seq.), National Pollutant Discharge Elimination System (NPDES) Permit Regulations [40 CFR 122.42(b)], requires notification of issuing authority of re-evaluation of POTW pretreatment standards. In the event that the POTW does not have a local limitation for a particular pollutant found in the leachate from a Superfund site, it must re-evaluate its local limitations, and develop a limitation if necessary to protect the POTW from interference, pass-through, or contamination of the sewage sludge.

(50) Clean Water Act, (33 U.S.C. §§ 1251 et seq.), National Pretreatment Standards (40 CFR 403.5), discharge to a POTW must not interfere, pass through untreated into the receiving waters, or contaminate sludge.

(51) Clean Water Act, (33 U.S.C. §§ 1251 et seq.), National Pretreatment Program Requirements for POTWs (40 CFR 403.8(f)).

The following is a list of potential ARARs for Superfund sites that discharge treated groundwater to surface water bodies:

(52) Clean Water Act, (33 U.S.C. §§ 1251 et seq.), NPDES Permit Regulations (40 CFR 122.21), permit application must include a detailed description of the proposed action including a listing of all required environmental permits.

(53) Clean Water Act, (33 U.S.C. §§ 1251 et seq.), NPDES Permit Regulations (40 CFR 122.44), establishes limitations, standards and other NPDES permit conditions, including federally approved State water quality standards.

(54) Clean Water Act, (33 U.S.C. §§ 1251 et seq.), NPDES Permit Regulations (40 CFR 122.44(a)), Best Available Technology (BAT) for toxic and non-conventional wastewater or Best Conventional Technology (BCT) for conventional pollutants.

(55) Clean Water Act, (33 U.S.C. §§ 1251 et seq.), NPDES Permit Regulations (40 CFR 122.44(b)), effluent limitations and standards requirements under Section 301, 302, 303, 307, 318 and 405 of the Clean Water Act (CWA).

(56) Clean Water Act, (33 U.S.C. §§ 1251 et seq.), NPDES Permit Regulations, Water Quality Standards and State Requirements (40 CFR 122.44(d)), Water Quality Based Effluent Limitations (WQBELs), any requirements in addition to or more stringent than promulgated effluent limitations and guidelines or standards under Section 301, 304, 306, 307, 318 and 405 of the CWA.

(57) Clean Water Act, (33 U.S.C. §§ 1251 et seq.), NPDES Permit Regulations, Technology Based Controls for Toxic Pollutants (40 CFR 122.44(e)), discharge limits established under paragraphs (a), (b), or (d) of 40 CFR 122.44 must be established for toxins to be discharged at concentrations exceeding levels achievable by the technology-based (BAT/BCT) standards.

(58) Clean Water Act, (33 U.S.C. §§ 1251 et seq.), NPDES Permit Regulations (40 CFR 122.44(i)), requires monitoring of discharges to ensure compliance.

(59) Clean Water Act, (33 U.S.C. §§ 1251 et seq.), NPDES Permit Regulations (40 CFR 125.100), the site operator must include a detailed description of the proposed action including a listing of all required environmental permits.

(60) Clean Water Act, (33 U.S.C. §§ 1251 et seq.), (40 CFR Part 131), states are granted enforcement jurisdiction over direct discharges and may adopt reasonable standards to protect or enhance the uses and qualities of state surface water bodies.

(61) Clean Water Act, (33 U.S.C. §§ 1251 et seq.), (40 CFR 136.1 - 136.4), requires adherence to sample preservation procedures including container materials and sample holding times.

(62) Fish and Wildlife Coordination Act, (16 U.S.C. §§ 661 et seq.), requires that any federal agency that proposes to modify a body of water must consult the U.S. Fish and Wildlife Services.

State

(63) Air - Illinois Environmental Protection Act, Section 9 (415 ILCS 5/9), Pollution Control Board (Title 35), Subtitle B - Subchapter C Emission Standards and Limitations for Stationary Sources, Part 211: Definitions and General Provisions (defines emission sources and related items); Part 112 Visible and Particulate Matter Emissions, sets emission limitations for particulate matter for a variety of operations, i.e., incinerators or waste storage piles. Also see Parts 214-219 that gives information regarding specific types of emissions per operation (e.g., sulfur, organic material, carbon monoxide and

nitrogen oxide emissions). These regulations may apply to some of the presumptive remedies in which emissions will be a factor, e.g., incineration.

(64) Air - Illinois Environmental Protection Act, Section 9 (415 ILCS 5/9), Pollution Control Board (Title 55), Subtitle B – Permits of Air Pollution, Part 201: Prohibition of Air Pollution, no person shall cause or threaten or allow the discharge or emission of any contaminant into the environment.

(65) Air - Illinois Environmental Protection Act, Section 9 (415 ILCS 5/9), Pollution Control Board (Title 35), Subtitle B – Air Pollution, Part 212; Visual and Particulate Matter Emission, emission standards for incinerators.

(66) Waste Disposal - Illinois Environmental Protection Act, Section 21 (415 ILCS 5/21), Pollution Control Board (Title 35), Subtitle G - Subchapter B: Permits, Part 703: RCRA Permit Program, rules on application for and issuance of RCRA permits; applicability and information requirements.

(67) Waste Disposal - Illinois Environmental Protection Act, Section 21 (415 ILCS 5/21), Pollution Control Board (Title 35), Subtitle G - Subchapter C: Hazardous Waste Operating Requirements, Parts 722 and 723, includes standards applicable to generators and transporters of hazardous waste, respectively.

(68) Waste Disposal - Illinois Environmental Protection Act, Section 21 (415 ILCS 5/21), Pollution Control Board (Title 35), Subtitle G - Subchapter C: Hazardous Waste Operating Requirements, Parts 724 and 725, includes standards applicable to owners and operators of hazardous waste treatment, storage and disposal facilities (Part 735 is for Interim Status) - corresponds to 40 CFR Parts 264 and 265.

(69) Waste Disposal - Illinois Environmental Protection Act, Section 21 (415 ILCS 5/21), Pollution Control Board (Title 35), Subtitle G - Subchapter C: Hazardous Waste Operating Requirements, Part 726, includes standards for the management of specific hazardous waste and specific types of hazardous waste management facilities; often applies to hazardous waste being used in such a way as to constitute disposal.

(70) Waste Disposal - Illinois Environmental Protection Act, Section 21 (415 ILCS 5/21), Pollution Control Board (Title 35), Subtitle G - Subchapter C: Hazardous Waste Operating Requirements, Part 728: Land Disposal Restrictions, defines land disposal restrictions for wastes, waste specific prohibitions, treatment standards, and prohibitions on storage.

(71) Waste Disposal - Illinois Environmental Protection Act, Section 21 (415 ILCS 5/21), Pollution Control Board (Title 35), Subtitle G - Subchapter C: Hazardous Waste Operating Requirements, Part 729: Prohibited Hazardous Wastes in Land Disposal Units, describes general hazardous waste restrictions and restrictions on halogenated solvents and liquid hazardous wastes in landfills.

(72) Waste Disposal - Illinois Environmental Protection Act, Section 21 (415 ILCS 5/21), Pollution Control Board (Title 35), Subtitle G - Subchapter D: Underground Injection Control and Underground Tank Storage Program, Part 731: Underground Storage Tanks, regulations regarding USTs.

(73) Waste Disposal - Illinois Environmental Protection Act, Section 21 (415 ILCS 5/21), Pollution Control Board (Title 35), Subtitle G - Subchapter D: Underground Injection Control and Underground Tank Storage Program, Part 740: Site Remediation Program, procedures established for investigation and remediation at sites where there is a release,

or suspected release of hazardous substances, pesticides, or petroleum for review and approval of these activities.

(74) Waste Disposal - Illinois Environmental Protection Act, Section 21 (415 ILCS 5/21), Pollution Control Board (Title 35), Subtitle G - Subchapter D: Underground Injection Control and Underground Tank Storage Program, Part 742: Tiered Approach to Corrective Action Objectives, procedures for evaluating the risk to human health posed by environmental conditions and develop remediation objectives that achieve acceptable risk level. Also, to provide for adequate protection of human health and the environment based on risks to human health posed by environmental conditions while incorporating site related information.

(75) Waste Disposal - Illinois Environmental Protection Act, Section 21 (415 ILCS 5/21), Pollution Control Board (Title 35), Subtitle G - Subchapter H: Illinois "Superfund" Program, Part 750: Illinois Hazardous Substances Pollution Contingency Plan, regulation which is applicable whenever there is a release or a threat of a release at a site; this part assigns responsibility, organization and guidelines for phased hazardous substance response including development of remedial alternatives and engineering methods for on-site actions and remedying releases.

(76) Waste Disposal - Illinois Environmental Protection Act, Section 21 (415 ILCS 5/21), Pollution Control Board (Title 35), Subtitle G - Subchapter I: Solid Waste and Special Waste Hauling, Part 807 includes information on solid waste permitting, sanitary landfills and closure and post-closure care; Part 808 includes information on special waste classifications.

(77) Water - Illinois Environmental Protection Act, Section 12 (415 ILCS 5/12), Pollution Control Board (Title 35), Subtitle C - Part 304: Effluent Standards, general and temporary effluent standards including NPDES effluent standards.

(78) Water - Illinois Environmental Protection Act, Section 12 (415 ILCS 5/12), Pollution Control Board (Title 35), Subtitle C - Part 309: Permits, Subpart A includes provisions for NPDES permits and Subpart B includes provisions for all other water related permitting.

(79) Public Water Supplies - Illinois Environmental Protection Act, Section 14 (415 ILCS 5/14), Pollution Control Board (Title 35), Subtitle F - Part 620: Groundwater Quality, prescribes various aspects of groundwater quality including methods of classification of groundwater, non-degradation provisions, standards for quality of groundwater and various procedures and protocols for the management and protection of groundwater.

Other Requirements to be Considered (TBCs)

Federal

(80) Geological Survey Professional Paper 579-0, Elemental Composition of Surficial Materials in the Conterminous United States, 1971. Schacklette, H.T., J.C. Hamilton, J.G. Boerrgen and J.M. Bowles, provides background levels of metal in soils for the United States.

(81) Occupational Safety and Health Administration Standards (29 CFR Part 1910; 1910.1000), Subpart Z, Toxic and Hazardous Substances, sets worker exposure limits to toxic and hazardous substances and prescribes the methods for determination of concentrations.

(82) Occupational Safety and Health Administration Standards (29 CFR Part 1910; 1910.95), Subpart G, Occupational Noise Exposure, sets limits of worker exposure to noise during the performance of their duties.

(83) Occupational Safety and Health Administration Standards (29 CFR Part 1910; 1910.120), Hazardous Waste Operations and Emergency Response, sets the standards for workers conducting hazardous waste operations and emergency response.

(84) Occupational Safety and Health Administration Standards (29 CFR Part 1926), specifies the type of safety equipment and procedures to be followed during site remediation.

(85) Occupational Safety and Health Administration Standards Record keeping, Reporting and Related Regulations (29 CFR Part 1904), establishes Record keeping and reporting requirements for an employer under OSHA.

(86) OSWER Directive 9355.0-48FS - Presumptive Remedies: Site Characterization and Technology Selection for CERCLA Sites with Volatile Organic Compounds in Soil, September 1993, addresses the vadose zone only.

(87) OSWER Directive 9355.3-01, October 1988 Interim Final - Guidance for Conducting Remedial Investigations and Feasibility Studies under CERCLA Development and Screening of Remedial Alternatives, development of the FS Work Plan.

(88) OSWER Directive 9355.4-01-Guidance on Remedial Actions for Superfund Sites with PCB Contamination, sets soil PCB clean-up levels and management controls for PCB concentrations at Superfund sites.

(89) OSWER Directive 9355.4-12 - Revised Interim Soil Lead Guidance for CERCLA Sites and RCRA Sites and RCRA Corrective Action Facilities, sets soil lead clean-up levels for Superfund sites.

(90) Safe Drinking Water Act (42 U.S.C. §§ 300f et seq.), Subpart F, Maximum Containment Level Goals (40 CFR 141.50 - 141. 51), establishes enforceable clean-up goals for drinking water based on technology and health risk.

(91) Threshold Limit Values, consensus standards for controlling air quality in work place environments; used to assess site inhalation risks for soil removal operations.

(92) U.S. Environmental Protection Agency, RCRA Guidance Manual for Subpart G Closure and Post-Closure Standards and Subpart H Cost Estimating Requirements, January 1987. Provides guidance on closure and post-closure standards and cost estimating requirements for hazardous waste management units.

(93) U.S. Environmental Protection Agency, Disposal of Polychlorinated Biphenyls, Proposed Rule, December 6, 1994. Provides for disposal of non-liquid PCB remediation waste generated by clean-up process of their existing concentration; provides for a risk-based remediation option for PCB remediation waste.

(94) U.S. Environmental Protection Agency, Soil Screening Guidance, December 1994. Provides generic risk-based soil screening values for Superfund sites.

(95) U.S. Environmental Protection Agency Region III, Risk - Based Concentration Table, Smith R., 1995. Provides risk-based screening values for groundwater and soil concentrations.

(96) U.S. Environmental Protection Agency, Integrated Risk Information System (IRIS), 1995 - 1996. Provides reference doses and cancer potency slopes for calculating the hazard index or incremental cancer risk for specific site contaminants.

(97) U.S. Environmental Protection Agency, Interim Policy for Planning and Implementing CERCLA Off-Site Response Actions, November 5, 1995. Specifies appropriate method of off-site treatment on disposed of waste from a Superfund site.
(98) U.S. Environmental Protection Agency, Summary Quality Criteria for Water, Office of Science and Technology, 1992. Provides ambient water quality criteria.
(99) U.S. Environmental Protection Agency, Quality Criteria for Water, Office of Water Regulation and Standards, U.S. EPA 440/5-86-001, 1986. Provides ambient water quality criteria.
(100) U.S. Environmental Protection Agency, Ambient Water Quality Criteria for Polychlorinated Biphenyls, U.S. EPA 440/5-80-068, 1980. Provides ambient water quality criteria for PCBs.
(101) U.S. Environmental Protection Agency, Risk Assessment Guidance for Superfund: Environmental Evaluation Manual, Volume II, Final Report, EPA/540/1-89/002, 1989. Provides guidance for conducting ecological risk assessments.
(102) U.S. Environmental Protection Agency, Risk Assessment Guidance for Superfund. Volume I. Human Health Evaluation Manual Supplemental Guidance. Standard Default Exposure Factors, Interim Final, March, 1991. OSWER Directive #9285.6-03, 1991. Provides exposure factors for estimating hazard or risk in human health risk assessments.
(103) U.S. Environmental Protection Agency, Risk Assessment Guidance for Superfund. Volume I: Human Health Evaluation Manual, Part A, December, 1989. U.S. EPA 540/1-89/002. Office of Emergency and Remedial Response. Provides guidance on preparing a baseline human health risk assessment using the four steps, data evaluation, exposure assessment, toxicity assessment, risk characterization.

Illinois
Environmental
Protection Agency

Office of Community Relations
1021 North Grand Ave. East
Springfield, Illinois 62794-9276

Responsiveness Summary

Source Control Feasibility Study and Proposed Plan

Southeast Rockford Groundwater Contamination Superfund Site

Rockford, Illinois

May 2002

Table of Contents

Figures

Responsiveness Summary

Public Comment
on the Source Control Feasibility Study and Proposed Plan

Southeast Rockford Groundwater Contamination Superfund Project
May 2002

OVERVIEW

In accordance with Section 117, 42 U.S.C. Section 9617, of the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) of 1980, the Illinois Environmental Protection Agency (Illinois EPA or Agency) and the United States Environmental Protection Agency (U.S. EPA) held a public comment period from June 11, 2001 through August 20, 2001 to allow interested parties to comment on the Southeast Rockford Source Control Operable Unit Focused Feasibility Study (hereafter referred to as the Source Control Feasibility Study) and the Proposed Plan (for the) Source Control Response Action (hereafter referred to as the Source Control Proposed Plan) for the source control operable unit of the Southeast Rockford Groundwater Contamination Superfund site in Rockford, Illinois.

The Illinois EPA presented the Source Control Feasibility Study and the Source Control Proposed Plan at six informational meetings (two per day) on June 26, June 27 and June 28, 2001, and at a formal hearing held in two sessions on July 19, 2001. The informational meetings were held at the Villa di Roma restaurant at 11th and Harrison Streets in Rockford, and the public hearing was held at the Brooke Road United Methodist Church at 1404 Brooke Road in Rockford.

The purpose of this responsiveness summary is to document the Illinois EPA's responses to comments received during the public comment period. These comments were considered prior to selection of a final remedy for the control of the four major sources of contamination at the Southeast Rockford Superfund site. The remedy is detailed in Illinois EPA's Record of Decision with which the U.S. EPA concurs.

BACKGROUND OF COMMUNITY INVOLVEMENT AND CONCERNS

Background. Illinois EPA has been responsible for conducting community relations during the investigation for the Drinking Water Operable Unit (Operable Unit 1), Phase I and Phase II of the Groundwater Remedial Investigation and Feasibility Study (Operable Unit 2) and the Source Control Remedial Investigation and Focused Feasibility Study (Operable Unit 3).

The site first came to the attention of the Illinois EPA with a citizen's complaint that plating waste had been dumped in an abandoned well. Subsequent tests of nearby private wells did not detect plating wastes but did find chlorinated solvents commonly used in industry for such things as degreasing machinery. The solvents are in a group of chemicals called volatile organic compounds (VOCs). They are called "volatile" because they evaporate readily and "organic" because they contain carbon. A meeting held in 1984 by the Illinois Department of Public Health (IDPH) and the Illinois EPA drew a crowd of approximately 200. Ongoing concern, however, did not appear to surface until the site was placed on the National Priorities List in 1989 and financial institutions began refusing home mortgage and improvement loans in the area.

Emergency Response Action. In 1989, the U.S. EPA began an emergency response action by giving eligible residents and businesses bottled water. Later U.S. EPA gave these parties point-of-use filters and subsequently connected them to the Rockford Public Water Supply. In October 1989, the Illinois EPA and U.S. EPA held 10 informational meetings to explain this action to residents and inform them of next steps.

Drinking Water Operable Unit. The purpose of the first operable unit was to identify all residences with private wells that had water violating the U.S. EPA drinking water standards. In 1991, the Illinois EPA held a public comment period and public hearing to receive comments on the feasibility study and proposed plan for the drinking water remedy. During this operable unit, many citizens resisted the idea of connections to the public water supply, because, in order to receive the public water connection, they had to sign an agreement to be annexed into the City of Rockford if their property became contiguous to city property. That issue is no longer a major concern, because nearly all of the area has now been annexed by the City of Rockford.

The Illinois EPA and U.S. EPA signed a Record of Decision for the first operable unit in June 1991 providing public water connections to eligible residents and businesses with private well water that violated U.S. EPA drinking water standards. The Record of Decision also provided granular activated carbon treatment for Municipal Well #35.

Groundwater Operable Unit. In 1995, the Illinois EPA held a public comment period and public hearing on the feasibility study and proposed plan for the groundwater remedy. The public hearing was preceded by a series of informational meetings. The proposed plan for the groundwater included public water connections to all those with private wells that were projected to be affected by the project's contaminated groundwater plume in 70 years, continued treatment of Municipal Well #35, and ongoing monitoring and additional public water connections if necessary. Natural attenuation was designated as the remedy for the site-wide groundwater. The plan was contingent upon control of the four major source areas. The plan was accepted and the Illinois EPA and U.S. EPA signed a Record of Decision for the groundwater in September 1995.

The City of Rockford has entered into two consent decrees with the State of Illinois and the United States of America regarding the Southeast Rockford Groundwater Contamination Superfund Site. The original consent decree was entered in federal court in April 1998. That consent decree required the City of Rockford to perform the remedial work required by the September 1995 Groundwater Record of Decision.

An amended consent decree was entered in federal court on January 13, 1999, and it included provisions for reimbursement of past costs as well as a $5 million cash-out for Area 7. The City of Rockford entered into these consent decrees in an effort to forestall what they saw as an area-wide threat of potential lawsuits regarding liability, which the City feared would dampen the economic climate in Rockford. Industries, which contributed to the costs the City of Rockford incurred, were given certain releases of liability by the State of Illinois and the federal government. No releases were given to parties for sources of contamination on their property.

The City of Rockford has constructed the public water supply connections and is conducting ongoing groundwater monitoring and treatment of Municipal Well #35 in accordance with the consent decrees.

Source Control Operable Unit. In June 2001, the Illinois EPA began the community relations effort described in the "Overview" section above. The key issues raised during this comment period are summarized below, followed by a more detailed summary list of comments with the Illinois EPA and U.S. EPA response to each of the comments.

KEY ISSUES

The main issues raised during the Source Control Operable Unit comment period are summarized below.

Issue #1. The City of Rockford is concerned that the remedy may be used to resurrect the threat of community-wide litigation.

Issue #2. The City of Rockford is concerned that the construction of a barrier wall in Area 9/10 will disrupt city transportation and utilities.

Issue #3. The Rockford Park District is concerned that structures needed for the remedy for Area 7 may become the target for vandalism.

Issue #4. The Rockford Park District is concerned that the presence of contaminants in Area 7 and the construction and operation of the remedy for Area 7 may interfere with the use of Ekberg Park.

Issue #5. The residents living near Area 7 are concerned that the remedy not pose a health risk to those using the park or living nearby.

Issue #6. The residents living near Area 7 are concerned that the above-ground-structure needed for the remedy blend in with the neighborhood and not cause the area to be unfairly stigmatized as an unsafe place to live.

Issue #7. There is concern and confusion about the term "leachate".

Issue #8. The Winnebago County Health Department is concerned that there are still 10 properties in the 70 year projected plume area that are not connected to the Rockford Public

Water Supply, because the property owners refused the connection. The Health Department's concern is that renters and future owners of the 10 properties may not be aware of the possible health hazard of drinking water from private wells on those properties.

Issue #9. There are requests to receive "clean" letters from property owners in Areas 9/10 and 11 who own buildings that do not appear to be primary sources of contamination.

Issue #10. Rockford Products is concerned that statements made in the Proposed Plan and fact sheet unfairly imply that Rockford Products is a major source of contamination.

Issue #11. Rockford Products is concerned that the implementation of a remedy for Area 9/10 would deprive them of use of their property.

Issue #12. Hamilton Sundstrand is concerned that there has not been enough information gathered to justify the remedy for Area 9/10.

SUMMARY OF PUBLIC COMMENTS AND ILLINOIS EPA RESPONSES

General Questions and Comments

1. Question: What is the time line for the remediation?

Response: The design of the remedies, which includes precise engineering details, is scheduled for the year 2002. The Illinois EPA hopes to begin actual construction of the remedies in 2003. The time remediation will take varies for each area. The following is an estimate of the length of time each remedy will take after construction is complete.

Area 4

Soil Remedy..... Approximately one month
Leachate Remedy .....35 to 45 years

Area 7

Soil Remedy.....15-25 years
Leachate Remedy.....30-40 years

Area 9/10

Because of lack of data in Area 9/10, time frames for the Area 9/10 remedies can only be described in relationship to all of the remedies studied for that area. The alternative that is the chosen Area 9/10 soil remedy will take less time than the other soil alternatives studied for Area 9/10. The chosen Area 9/10 leachate remedy will take less time than any of the other Area 9/10 leachate remedies studied with the exception of the reactive barrier wall.

Area 11

Soil Remedy.....2-5 years
Leachate Remedy.....No action

2. **Question:** Is there a trichloroethylene (TCE) registry for the area?

Response: Yes, the Agency for Toxic Substances and Disease Registry (ATSDR) has established a nation-wide TCE registry. ATSDR is a federal agency, which is part of the Centers for Disease Control and Prevention. This registry collects health information on people throughout the United States who have been exposed to TCE. For more information about the registry, contact Dr. Ginger L. Gist of ATSDR at 1-888-422-8737.

3. **Question:** How deep is the contamination?

Response: Illinois EPA investigations have found contamination in groundwater outside the four source areas to a depth of at least 100 feet below ground surface. The contamination in the source areas is much shallower, the deepest around 35 to 40 feet.

4. **Question:** Since the contamination is so far beneath ground surface, what risk does it pose to humans?

Response: The risks are the following:

- The groundwater in Winnebago County is a valuable resource. Reportedly 100% of Winnebago County residents use groundwater as a drinking water source. The 1995 groundwater remedy—natural attenuation—was designed to reclaim this resource in southeast Rockford for future generations. Illinois EPA investigations indicate that some of the contamination in each of the four areas may be free product (sometimes called non-aqueous phase liquid or NAPL). Natural attenuation is a natural process where either naturally occurring microbes in the soil break down the contaminants into harmless components, or the contaminants become attached to soil particles preventing them from moving into the groundwater. Free product is so concentrated that natural attenuation does not occur, so the contaminants remain in the groundwater making this resource unusable for future generations.
- The major sources of contamination must be controlled and the free product removed so contamination does not move into new areas, contaminating the drinking water supply of those who are still on private wells.
- People who are in the area of contaminated groundwater and refused to connect to the Rockford Public Water Supply have the risk of drinking and bathing in contaminated water from their private wells. Owners of 10 properties have refused to be connected to the Rockford Public Water Supply.
- Some of the contamination is fairly close to the surface. In Area 4, Illinois EPA investigations found very high levels four feet beneath ground surface. Digging into these areas for foundations or for other reasons would expose workers, and possibly surrounding neighborhoods, to a high level of contamination.

- Because the contaminants are volatile, meaning they evaporate or volatilize readily, there is a possibility that vapors from the contaminants could move through the soil into basements of nearby houses. The Illinois EPA and the Illinois Department of Public Health have tested basements in houses nearest the two source areas in residential neighborhoods, Area 4 and Area 7. These tests indicate that levels found so far are not at levels of concern. If the source areas are not remedied, however, there will always be the possibility that contaminants could move into nearby basements.

5. Question: If only 10 properties are not connected to the Rockford Public Water Supply, would it not be cheaper to connect these 10 properties instead of trying to remedy the four source areas?

Response: The people in the contaminated groundwater area who are not connected to the Rockford Public Water Supply had free connections offered to them by the U. S. EPA, the Illinois EPA, and/or the City of Rockford. They cannot be forced to connect. Also see response to previous comment.

6. Comment: The Winnebago County Health Department asks that the Illinois EPA, the Illinois Department of Public Health, the City of Rockford and the Winnebago County Health Department determine the legal options available to protect people who rent homes located at the 10 properties whose owners refused to connect to the Rockford Public Water Supply. They also ask that these same governmental bodies look at legal options to protect people who may purchase these properties in the future.

Response: The Illinois EPA commits to work with the Winnebago County Health Department, the Illinois Department of Public Health and the City of Rockford to determine the options available to protect purchasers or renters of homes located at the 10 properties whose owners refused to connect to the Rockford Public Water Supply under this project.

7. Comment: The City of Rockford supports addressing the four major source areas of contamination. The City also wishes to express concern that the treatment goals for the final design of the facilities and the level of attenuation and standards for surface water and atmosphere discharges be consistent with the long-term nature of the area-wide natural attenuation remedy and the scale and magnitude of the problem in southeast Rockford.

Response: The Illinois EPA shares this concern. All actions taken to implement the remedies for the four source areas must comply with all federal, state and local laws and regulations that are applicable or appropriate and relevant. For example, all discharges to the air and all discharges to surface water must be in full compliance with state and federal laws and regulations. The treatment goals for groundwater are determined by state and federal groundwater laws and regulations. The soil treatment goals have been established in compliance with procedures developed to protect human health and the environment. In addition, the 1995 Groundwater Record of Decision also specifies that the sources of groundwater contamination be controlled in order that the groundwater remedy of natural attenuation can meet the remediation goals of drinking water standards by 2200.

8. Question: Have all of the contaminants been identified? If so may I have a list?

Response: The main contaminants are listed in the fact sheets. The complete list of contaminants are listed in the remedial investigation reports which are located in the two local repositories: (1) the Rock River Branch of the Rockford Public Library at 3128 South 11th Street and (2) the Ken-Rock Community Center at 3218 South 11th Street.

9. Comment: Would it not be more practical and provide economies of scale in both construction and operation of the remedies, to have the same remedies for all four source areas?

Response: Having the same remedies for all four source areas is impractical, because the four source areas are considerably different from one another. For example, Area 7 consists of at least four major spots with contamination by a wide range of chemicals at varying concentrations in ill-defined locations. Area 4 consists mainly of 1,1,1-trichloroethane in one relatively small and well-defined area.

Liability and the 1998 Consent Decree and 1999 Amended Consent Decree

10. Comment: The City of Rockford is concerned that the remedy may be used to resurrect the threat of community-wide litigation. The concern is not with the treatment of soils that contain contaminants that threaten to enter the groundwater. Neither is the concern with certain groundwater remedial actions designed to keep the contaminants in the soil in well-defined pieces of property. The concern is the parts of the remedy that seem to address contaminants in groundwater that migrate from property to property. Designating liability for those contaminants, since the source is ill defined, resurrects the threat of community-wide litigation.

Response: The Illinois EPA has considered this comment and in response has modified the leachate remediation goals for each source area to consider background concentrations coming into each of the areas. "Background" concentrations for a source area are concentrations of contaminants that are determined, using procedures defined in the Resource Conservation and Recovery Act (RCRA), to originate upgradient from a specific source. This means that if upgradient groundwater (groundwater coming onto one's property) were determined to be contaminated, allowances would be made in accordance with RCRA to subtract these concentrations from those found in downgradient groundwater when setting the remediation goals for a source area. The origin of the contaminants coming into a source area does not have to be determined in order to establish background.

11. Comment: The City comments that if a property owner is responsible for the leachate on their property, how does one know the origin of the contaminants in the leachate? How does one know the level of contaminants entering and leaving one's property? Perhaps the contaminants originated elsewhere. The consent decree signed by the City of Rockford and the U. S. Government and the State of Illinois was meant to avoid the uncertainty about responsibility for contaminated groundwater.

Response: See the response to comment #10. RCRA establishes the method for determining the level of contaminants entering and leaving one's property. In general, one or more monitoring wells are placed upgradient from an area. Concentrations in groundwater samples from those wells are compared to concentrations in groundwater collected from downgradient wells. The difference in concentrations between the two wells is considered to originate on the property.

12. Comment: Will landowners be required to clean up the groundwater to drinking water standards even if the water entering their property violates these standards? If so, then the uncertainty of liability, which the consent decree was designed to alleviate, is again an issue.

Response: See the response to comment #10. The City of Rockford and interested parties should also consider the responsive letters from Illinois EPA (June 8, 2001) and U. S EPA (June 25, 2001) that offered specific reassurance concerning the above mentioned covenant and its meaning. These letters are repeated in relevant part in the response to comment/question #85.

13. Comment: The City of Rockford comments that the term "leachate" was never used in its discussions with the State of Illinois and the U. S. government in negotiating the consent decrees between the parties. (See the discussions regarding the consent decree beginning on page 2.) The City asks how the term "leachate" differs from "contaminated" or "highly contaminated" groundwater. Is it something objectionable **in** the groundwater?

Response: The Illinois EPA defined "leachate" as source material that has moved, or could potentially move, from a source area into groundwater in the vicinity of the four primary source areas. Leachate consists of a high concentration of contaminants that have leached from the source material into the surrounding groundwater. It is distinct from the surrounding groundwater due to those relatively high concentrations and acts as a continuing source of contamination to the surrounding, less contaminated groundwater.

14. Comment: The Source Control Proposed Plan is, on its face, inconsistent with the spirit, intent, purpose and letter of both the 1995 Record of Decision and the ensuing 1998 Consent Decree entered with respect to the Southeast Rockford Superfund Site. The "leachate" remedy is inconsistent with the prior groundwater release granted by the earlier consent decree.

Response: The Illinois EPA's position is that the groundwater remedy (natural attenuation), specified in the 1995 Groundwater Record of Decision, was based on the clearly stated condition that the major sources of groundwater contamination be controlled. The groundwater modeling, which was the basis for projections about the movement of the contaminant plume and the time it would take for natural attenuation to bring the groundwater into compliance with drinking water standards, was based on source control. In effect, the 1995 Groundwater Record of Decision mandates source control. The leachate remedies for the source areas are an important part of source control.

The 1998 and 1999 consent decrees recognized the same distinction between the overall groundwater remedy and the source control remedies delineated in the 1995 Groundwater Record of Decision. The covenant not to sue covenant beneficiaries found in Section VIII of the

1999 Amended Consent Decree specifically excludes liability for "Reserved Source Containment Response Action and Costs" (Section VIII 9 and 10). "Reserved Source Containment Response Action and Costs" is defined in Section IV as response actions and response costs (with interest) to contain or control sources (with the exception of Source Area 7) of site-wide groundwater contamination. These actions and costs are further described as those that contain or control releases or threats of releases of hazardous substances from source areas. The leachate remedies identified in the Source Control Record of Decision are within the definition of "Reserved Source Containment Response Actions and Costs" as stated in the 1999 amended consent decree.

15. Comment: The Illinois EPA should delete the words "has migrated" from its definition of "leachate".

Response: The Illinois EPA disagrees with this comment. The central meaning of "leachate" entails source material migrating into groundwater. If the source material does not "migrate" into the groundwater, there would be no leachate.

16. Comment: Given that it is vitally important to the City of Rockford and Rockford area businesses to fully understand the differences between "leachate" and "contaminated groundwater", the Illinois EPA and U.S. EPA should provide clear definitions so that a clear distinction can be made between the two terms.

Response: See response to comments #13 and #15.

Source Area 7

17. Comment: The Rockford Park District has two concerns: (1) that the structures needed for the Area 7 remedy may become the target for vandalism and (2) that the presence of contaminants in Area 7 and the construction and operation of the Area 7 remedy may interfere with the use of Ekberg Park. Therefore, the Park District thinks that the best location for the treatment building would be the northwest corner of the park. They request that the building be constructed of precast concrete, concrete cinder block or brick. The Park District requests the opportunity to review and approve the location and building materials to be used prior to the bidding process.

Response: The Illinois EPA will work with the Rockford Park District and the Pine Manor Association in determining the location of the treatment building and the type of construction materials for the building. Since there are several different interests involved, the Illinois EPA cannot guarantee approval rights to any one party but intends to work with both parties to reach an agreement, if possible, that satisfies both, as well as satisfying the goal of an effective remedy.

18. Comment: The Pine Manor Association asks that the buildings necessary for the remedy be located as far as possible from the park and all the homes in the neighborhood.

Response: See response to the previous comment.

19. Comment: The outside appearance of the buildings must be equal to the appearances of the homes in the neighborhood.

Response: See response to previous comments.

20. Comment: The Pine Manor Neighborhood Association requests to see the final plan for all aboveground construction necessary for the Area 7 remedy before the remedy is implemented.

Response: The Illinois EPA will show the plans for the above ground construction to leaders of the Pine Manor Neighborhood Association before construction begins.

21. Comment: The Association requests that the existing monitoring wells be modified so they are flush with the ground.

Response: The Illinois EPA will flush mount the existing monitoring wells that are located in the park. The existing monitoring wells on Mr. Ekberg's property will remain as is to lessen the possibility that they may be damaged by heavy equipment that Mr. Ekberg is using.

22. Comment: The Association requests that all of the items (such as tennis courts, basketball courts, playground area, grass area, and street) that are removed or damaged during construction of the remedy be replaced to equal or better than it was at the beginning of construction.

Response: The Illinois EPA will do this.

23. Question: How will the property above the underground piping system be affected and how will it be maintained? Will the aboveground property stay a field or can it be built upon?

Response: The property above the piping will remain a field and can be used as the field was used. Buildings will not be allowed to be constructed on top of the piping. The Illinois EPA, however, has worked with the Rockford Park District so that they could safely install the new playground equipment that they had planned for the Ekberg Park.

24. Question: Who will own the property after the remedy is constructed, the Illinois EPA or the current landowner?

Response: The current landowners will retain ownership of the property.

25. Comment: The emissions from the catalytic oxidation unit must be safe **at all times.**

Response: The Illinois EPA has carefully researched methods to ensure that emissions from the catalytic oxidation unit are safe. The following are the measures that will be taken.

- The system will be outfitted with a catalyst module that breaks the volatile organic compounds into carbon dioxide, water and hydrochloric acid.

- The system will be outfitted with a scrubber that will neutralize and remove the hydrochloric acid before emissions are released into the air.

- The system will be tested thoroughly in a proof-of-performance test before regular operations begin. Emissions will be tested for site-related hazardous air pollutants, carbon monoxide, total volatile organic compounds, dioxins and hydrochloric acid. For some of these parameters, such as dioxins and hazardous air pollutants, samples of air emissions from the stack will be collected and sent to a laboratory for analysis. The unit will be shut down until laboratory results are available showing the emission standards are met.

- During the proof-of-performance test, the unit's operating conditions, such as temperature of the vapors entering and exiting the catalyst module and the flow rate, will be monitored continuously.

- During regular operations, the same operating conditions, such as temperature and flow rate, that were monitored during the proof-of-performance test will be monitored in real time. Real time monitoring means the monitoring results are available immediately. The unit's operating conditions during regular operations must meet the same operating conditions as they did during a successful proof-of-performance test.

- The system will be equipped with a mechanism that will shut down the unit if it fails to meet requirements. For example, if the control panel loses electrical power, if there is loss of proper airflow or loss of flame, or if temperatures or fuel pressure are not in the required ranges, the system will automatically shut down.

26. Comment: We are concerned that the emissions may not be tested often enough. What is the safe and regular interval of testing? Weekly? Bi-weekly? Monthly?

Response: The operating conditions of the unit will be monitored continuously to make sure they are within required ranges for successful destruction of the contaminants. The specific testing schedule of the air emissions themselves will be determined during the design phase of the project. Typically, emissions from this type of unit are tested once a week. The actual schedule for this unit will be determined in consultation with the Illinois EPA Bureau of Air. Although no actual permit is required for the air emissions because the site is a federal Superfund site, air emissions and schedules for testing air emissions will have to meet all federal and state permit requirements.

27. Comment: Will the equipment have a safety shut down system? If anything goes wrong, the system should shut down automatically.

Response: If the operation conditions are not in required ranges, the system feeding the vapors into the unit will be shut down immediately.

28. Comment: The automatic shut down system should be tested on a regular basis. How often will it be tested? Weekly? Biweekly? Monthly?

Response: The automatic shut down system will be tested on a regular basis. The exact testing schedule will be determined in the design phase in consultation with the Illinois EPA Bureau of Air.

29. Comment: If the system shuts down, **all emissions** should be contained inside the building instantly.

Response: When the unit shuts down, the system feeding the contaminant vapors into the system will also immediately shut down so that there will be no more emissions from the unit.

30. Comment: We like the proposed remedy for Area 7. Could the Illinois EPA be mindful of the children's safety and do the construction in the early spring or early fall instead of the late spring and summer when the children most use the park.

Response: The Illinois EPA is very concerned about the safety of children using the park as well as others in the vicinity. The Illinois EPA prefers that the remedy be constructed in early spring or early fall but cannot make a commitment to timing. The Illinois EPA, however, does commit that they and their contractor will take all precautions necessary to protect residents, including children, during construction. Precautions could include fencing of the construction area and spotters behind equipment that is backing up.

31. Comment: The landscaping on the outside of the building must be equal to the appearances of the homes in the neighborhood.

Response: The Illinois EPA will do this.

32. Comment: Landscaping and the buildings must be maintained on a regular basis.

Response: The Illinois EPA will do this.

33. Comment: Locate all the aboveground equipment inside the building. No equipment or barrels should be stored outside.

Response: Water and leachate will be collected in tanks prior to off-site disposal. All tanks and other equipment will be stored inside the building.

34. Comment: The building should have a perimeter security system installed. The system should be capable of notifying the Illinois EPA, the Rockford City Police Department, or the Rockford Fire Department if need be. The building should have an 800 number to call in case of trouble. This number should be posted clearly on the outside of the building.

Response: The building will be fenced and a security system, capable of notifying local authorities will be installed. An 800 or local number that residents can call in case of emergency will be posted on the building or fence.

35. Comment: The sound level on the outside of the building should be set to a quiet neighborhood standard.

Response: Except during construction, all equipment will be inside the building so the operations should meet residential noise standards. During construction there will be the noise that is normally connected with construction equipment, but no construction will take place at night

Source Area 9/10

EVALUATION OF AREA 9/10 ALTERNATIVES

Area 9/10 Source Control Proposed Plan preferred leachate alternative (reactive barrier wall)

36. Comment: The underflow of untreated water beneath the reactive wall would likely exceed Class I standards. Therefore, the reactive barrier wall alternative would fail to comply with applicable or relevant and appropriate requirements (ARARs), a threshold criterion, and would not provide long-term effectiveness.

Response: The designed reactive barrier wall for Area 9/10 was the leachate alternative designated as the preferred alternative in the Source Control Proposed Plan. Since the issuance of the Source Control Proposed Plan, the Illinois EPA has gathered additional information about the facility indicating that there were releases of jet fuel and other petroleum based materials on the property. The Illinois EPA does not have documentation that these releases were adequately remediated. Reactive barrier walls are not an appropriate technology to remedy these materials, because the fuel tends to foul the wall rendering it less effective or ineffective. Therefore, the Illinois EPA has chosen enhanced air sparging as a leachate remedy in Area 9/10. Enhanced air sparging is alternative SCL-9/10E in the Source Control Feasibility Study. If results from further data collection in Area 9/10 indicate the presence of free product or higher concentrations of leachate than anticipated, a contingent remedy (leachate containment, collection and treatment--SCL 9/10B) may be implemented in addition to the selected leachate remedy.

37. Comment: No evaluation has been presented comparing the cost and implementation of the proposed groundwater remedial action for Area 9/10 to the already implemented monitored natural attenuation.

Response: See response to comment #36, #38, #40 and #61. Also, it should be noted that the Source Control Proposed Plan is not a groundwater remedial action but a source control remedial action designed to prevent contaminants originating in Area 9/10 from migrating into the area-wide groundwater. According to the modeling conducted for the 1995 groundwater remedy, the sources of contamination must be controlled in order for the groundwater remedy, natural attenuation, to work as projected.

38. Comment: The Source Control Feasibility Study provides little or no design basis for the reactive barrier wall remedy proposed for Area 9/10. None of the significant implementability issues have been addressed or examined, as required by the sixth criterion, implementability.

Response: See the response to comment #36. In addition, implementation issues were considered and reported during the development and preliminary screening of the remedial alternatives. Geotechnical, utility and construction access concerns, especially construction adjacent to city streets, were noted. It was further noted in the detailed evaluation that issues that impact the implementability of this alternative do not impact other alternatives to the same extent.

39. Comment: The Source Control Feasibility Study grossly underestimates the capital costs to implement a reactive barrier wall at Area 9/10.

Response: See response to comment #36 and #61.

40. Comment: The Source Control Feasibility Study does not provide appropriate consideration for the disruption, protection, or replacement of public or private infrastructure features.

Response: See the response to comment #36. In addition, the difficulties with implementation of this alternative were noted as appropriate for the level of effort required for a feasibility study where the technical and administrative feasibility and the availability of services and materials were considered.

41. Comment: The construction method proposed for the vertical barrier wall may not be feasible based on constructability issues such as excavation and area limitations. The analysis presented in the Source Control Feasibility Study fails to satisfy the implementability criterion.

Response: See response to comment #36 and #38.

42. Comment: The proposed reactive portion of the barrier wall, as described, may not be effective based on the improper sizing of the wall which would not allow for proper dechlorination reactions to occur in order to reduce contaminants to the desired levels.

Response: See response to comment #36. In addition, the reactive barrier wall was designed, as was each of the remedial alternatives, with the limited information available for Area 9/10. Treatability testing would have been conducted to refine the cost estimate and design of the wall.

43. Comment: The City of Rockford is very concerned about the impacts construction of a barrier wall will have on area utilities and transportation. Ninth Street is a major north-south thoroughfare in the City of Rockford. A major public water main lies within its right-of-way. The barrier wall alternative appears to have the most potential to affect basic service, and therefore the most potential for unanticipated cost. Have public cost and inconvenience been adequately addressed?

Response: See response to comment #36 regarding the change of the Area 9/10 leachate remedy. In addition the Illinois EPA will consult with Joint Underground Locating Information

for Excavators (JULIE) to make sure excavations will not disrupt underground utilities and with the City of Rockford to minimize disruption of traffic and city services.

44. Comment: The City of Rockford agrees that the reactive barrier wall would be the most efficient means of containment of a well-defined contamination plume. It appears that there is less information available at this location than would be ideal to make a fully informed decision on the remedy.

Response: See the response to comment #36.

45. Comment: The proposed location of the groundwater remedy is the Rockford Products parking lot. Rockford Products has not authorized any activity at the parking lot other than those investigative activities that have been completed and the continued presence of monitoring well MW 201. Rockford Products comments that the implementation of the groundwater remedial action would amount to a government taking of the parking lot.

Response: See the response to comment #36.

46. Comment: Based on the previous comments, the proposed groundwater remedial action (reactive barrier wall) with its long-term deprivation of the use of the parking lot by Rockford Products cannot be justified on the grounds that it is necessary for the overall groundwater remedy.

Response: See response to comment #36 regarding the change of the Area 9/10 leachate remedy from the reactive barrier wall to enhanced air sparging. Regarding the necessity of "groundwater remedial action" for the overall groundwater remedy, the distinction must be made between the leachate remedy for Area 9/10 which is a source control remedy and the decision on the overall groundwater remedy which was made in 1995. See the response to comment #14 for more information about the relationship between these two remedies.

47. Question: How will the barrier wall proposed for the leachate remedy be keyed into the bedrock?

Response: This question is a moot question. See response to the comment #36.

48. Comment: It is expected that the iron filings would have to be rejuvenated about every 10 years thus depriving the owners the use of the parking lot where the wall is proposed to be constructed. (Rejuvenation consists of air sparging; that is, forcing a jet of air into the wall so that the air knocks the rust off the filings and thus rejuvenates them.)

Response: See the response to comment #36.

49. Comment: Would a pump and treat system with air sparging prove more flexible in design and more adaptable to changing conditions than the barrier wall proposed for the leachate remedy?

Response: See the response to comment #36.

50. Comment: Rockford Products believes their comments require retractions of and/or modifications of statements made to justify the proposed groundwater remedial action. They state that additional analysis and re-evaluation of the proposed groundwater remedial action is needed to include full consideration of factors not completely or properly accounted for.

Response: See responses to previous comments in this section.

Area 9/10 leachate remedy in general

51. Comment: The Illinois EPA did not propose an active leachate remedial response alternative for Area 11 based on the use of fate and transport modeling. If the same analysis is applied to Area 9/10, the same conclusion should be reached.

Response: The Illinois EPA and U.S. EPA proposed and are choosing soil vapor extraction with treatment of vapors by catalytic oxidation for Area 9/10 and Area 11 soils. The proposed and chosen Area 11 leachate remedy is "No Action", because the contaminant plume in Area 11 is very different from the plume in Area 9/10 due to the high levels of aromatic compounds ethylbenzene, toluene, and xylene. These compounds greatly enhance the degradation of the chlorinated compounds that may be present in the plume. Additionally, it is well documented in the literature published on the subject of degradation of organic compounds that plumes containing aromatic compounds degrade more rapidly resulting in short plumes, especially in the presence of sufficient oxygen such as would be found in the subsurface in Area 11. Areas 9/10 and Area 11 do not have similar contaminant plumes, so the statement that modeling conducted for Area 9/10 would yield similar results as those for Area 11 is without basis.

52. Comment: The Source Control Feasibility Study failed to define the groundwater management zone (GMZ) for Area 9/10 as a three dimensional region.

Response: The GMZ boundaries outlined in the Source Control Proposed Plan were conceptual. The final three-dimensional GMZ boundaries will be established during the design phase of the project.

53. Comment: The Illinois EPA has not demonstrated that the proposed groundwater remedial action for Area 9/10 will be more effective than monitored natural attenuation in eliminating or reducing human risk. In fact, monitored natural attenuation is the proposed remedy for Area 11.

Response: The Illinois EPA is not choosing a "groundwater" remedial action for Area 9/10 in this record of decision. The site-wide groundwater remedy was designated in the 1995 Groundwater Record of Decision. This record of decision deals with the control of the four major sources of contamination that was mandated in the 1995 Groundwater Record of Decision. Source removal is necessary for natural attenuation to work within the 205 years projected by the 1995 Groundwater Record of Decision.

54. Comment: Assuming a half life of 1,1,1-trichloroethane (TCA) of ten years (which is higher than published values), the 12,000 parts per billion of TCA found in MW 201 would degrade naturally in 60 years which is much sooner than the estimated 205 years allowed for the

implementation of the groundwater remedy in the 1995 Record of Decision. Using the more realistic figure of five years for a half-life for TCA, the 12,000 parts per billion in MW 201 would be reduced to the goal of 200 parts per billion in less than 30 years, which is less than the 30 plus years predicted for the proposed groundwater remedy for Area 9/10.

Response: See response to Comment #81 regarding the solubility of TCA and the likelihood that TCA at concentrations of 12,000 parts per billion in groundwater indicate the presence of non-aqueous phase liquid (NAPL). The term "NAPL" is applied to concentrations of chemicals greater than the solubility of the chemicals in water. When chemicals are present at such high concentrations, they no longer easily dissolve in water but are present as free product. TCA at these high concentrations would need to enter the dissolved phase before it could degrade naturally, so the length of half-life that the commenter gives for TCA is not applicable. Half-life only applies to TCA at lower concentrations in the dissolved phase.

55. Comment: The groundwater data presented in the Administrative Record indicate that it will be technically impracticable to achieve Class I standards at the groundwater management zone boundaries. The Source Control Feasibility Study fails to provide sufficient information to adequately satisfy the second threshold criterion, compliance with applicable or relevant and appropriate requirements (ARARs). ARARs are federal, state and local laws and requirements with which the remedy must comply.

Response: The concern evidently expressed in this comment is that upgradient groundwater (water flowing into Area 9/10) may exceed Class I groundwater standards (drinking water standards) making it difficult to meet these standards downgradient from Area 9/10 even after contamination originating in Area 9/10 has been removed or controlled. Illinois groundwater regulations (IL Adm. Code 620) and the federal Resource Conservation and Recovery Act (RCRA) provide for the consideration of background (upgradient) groundwater contamination when setting remediation goals at the downgradient groundwater management zone boundary. This means that although the Area 9/10 remediation goal has been set as drinking water standards (Class I groundwater standards), that if it is demonstrated that water coming into Area 9/10 (or the other three source areas) exceeds these standards, allowances would be made in accordance with RCRA and Illinois groundwater regulations to consider these exceedances when setting the remediation goals downgradient of the source area. Since these allowances would be made in accordance with state and federal laws and regulations, they would meet ARARs.

56. Comment: The goal of Operable Unit 3 is to control sources of contamination that would continue to degrade site-wide groundwater. Since the limited available soils data for Area 9/10 indicate that hazardous substances are present at levels below concentrations that would continue to migrate to groundwater, no leachate remedy should be required for Area 9/10.

Response: See responses to previous comments and questions.

Area 9/10 Soil Remedy

57. Comment: The operation and maintenance cost for the Soil Vapor Extraction remedy is inappropriately based on the operational life of the system.

Response: It is acknowledged that a soil vapor extraction system would probably not be implemented for the 30 years specified in the Source Control Feasibility Study. However, given the uncertainties and lack of data for Area 9/10, the soil vapor extraction costs were based on an assumption that the system would operate for 30 years, because 30 years is the time required by the Resource Conservation and Recovery Act for post-closure care of waste left in place.

58. Comment: The Administrative Record does not support a determination that the risks posed by soils at Area 9/10 warrant a remedial response. The analysis fails to satisfy the first threshold criterion, an evaluation of the remedy's ability to provide overall protection of human health and the environment.

Response: As previously mentioned, since Sundstrand (now Hamilton Sundstrand) limited Illinois EPA access to the site, the soil data did not represent many locations where file data indicate sources of contamination may be located and where the highest concentrations of soil contaminants may be found. That file data were related to actions that Sundstrand had begun under the Resource Conservation and Recovery Act (RCRA) and so were not entered into the Administrative Record for this project, which is being conducted under a different program, the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) known as the Superfund Act. The Administrative Record at the time of the Source Control Proposed Plan did contain, however, results from one downgradient monitoring well, MW 201 (original location), with levels of VOC contamination that exceeded the soil saturation limit. Since upgradient wells had much lower levels, the Illinois EPA concluded that the soil on the Hamilton Sundstrand property in Area 9/10 must contain extremely high concentrations of VOCs to the extent that they would leach into the groundwater at the levels found in MW 201 (original location).

The Illinois EPA is now adding to the project Administrative Record File the information about the RCRA action begun by Sundstrand. This information is pertinent to knowledge of the site, and therefore, ultimately, to CERCLA decisions made concerning the site. This RCRA information includes documentation of high levels of VOCs on Hamilton Sundstrand's property, confirming the conclusion Illinois EPA had reached based on data from monitoring well MW 201 (original location). The Illinois EPA is also adding information to the Administrative Record File from the Illinois EPA's Leaking Underground Storage Tank files regarding reports of releases and tank removals by Sundstrand.

General comments about Area 9/10 remedies

59. Question: What was the basis for choosing the proposed alternatives for Area 9/10?

Response: The federal law requires proposed remedies to be evaluated using nine criteria: (1) overall protection of human health and the environment, (2) compliance with relevant state and federal laws and regulations, (3) long-term effectiveness and permanence, (4) reduction of toxicity, mobility or volume of contaminants through treatment, (5) short-term effectiveness, (6) implementability, (7) cost, (8) state acceptance and (9) community acceptance. The first two criteria are called threshold criteria, because all remedies must meet these two criteria. The next

five criteria are called balancing criteria, because the characteristics that meet these criteria may be balanced or weighed against one another. The last two are called modifying criteria. These criteria allow for the modification of the proposed plan in response to State or community concerns.

The State of Illinois had accepted the Source Control Proposed Plan when it was submitted for public comment. The community was given an opportunity to comment on the proposed plan during the public comment period. The plan as originally proposed was modified in response to community comments, and these modifications are reflected in this responsiveness summary and documented in the Source Control Record of Decision, which is supported by the U.S. EPA and the Illinois EPA.

60. Question: What other alternatives were evaluated for Area 9/10?

Response: Three soil alternatives were evaluated for Area 9/10: (1) no action, (2), institutional controls and (3) soil vapor extraction and treatment of vapors by granular activated carbon. Five leachate alternatives were evaluated for Area 9/10: (1) no action, (2) groundwater monitoring and leachate containment/collection and treatment by air stripping, (3) air sparging (in conjunction with soil vapor extraction for the soil remedy), (4) reactive barrier wall and (5) enhanced air sparging (leachate alternative #3 plus additional air sparging wells installed in the most highly contaminated portions of Area 9/10).

61. Comment: The cost estimates provided for the remedial response alternatives proposed for Area 9/10 do not appear to be accurate. The analysis fails to satisfy the requirements of the seventh National Contingency Plan (Superfund regulations) criterion, which is cost.

Response: The typical feasibility study cost estimates are expected to provide an accuracy of +50 percent to -30 percent and are prepared using available data. The costs were developed for each of the remedial alternatives based on similar assumptions. They are provided as a basis for comparison of the remedial alternatives. The costs were prepared as specified in the guidance for conducting feasibility studies.

62. Comment: The Source Control Feasibility Study fails to adequately evaluate the proposed remedial response alternatives against the nine National Contingency Plan criteria. The nine-criteria evaluation is neither sufficiently detailed nor accurate enough to support remedy selection.

Response: As previously stated, limited data were collected in Area 9/10 due to access restrictions imposed by the property owner and the presence of utilities. Given that, remedial alternatives were developed from data that were available at that time. The data suggested that elevated levels of chlorinated volatile organic compounds were present in Area 9/10. The remedial alternatives developed are known processes for addressing the contaminants found. The remedial alternatives were then evaluated against the nine criteria specified in the National Contingency Plan. Although it was not practicable to predict the time required to achieve the remediation goals (cleanup objectives) with the data available, an overall evaluation of protection of human health and the environment and compliance with applicable or relevant and

appropriate state and federal requirements was provided in sufficient detail to support remedy selection.

63. Comment: The Administrative Record does not provide any information that would indicate that a remedial response action at Area 9/10 would eliminate, reduce or control human health threats posed by area groundwater in Southeast Rockford. The Source Control Feasibility Study fails to provide sufficient information to adequately satisfy this first threshold criterion.

Response: The Illinois EPA has demonstrated that the response actions are necessary to protect human health and the environment. See response to Comment #4.

ADEQUACY OF AREA 9/10 CHARACTERIZATION

64. Comment: The fact that Illinois EPA reports in the Source Control Feasibility Study and the Source Control Proposed Plan that there is either a lack of data or there is a need for additional data from Area 9/10 prior to implementation of a remedy means that the Administrative Record does not support a conclusion that Area 9/10 has been adequately characterized, as required under the National Contingency Plan, and does not support selection of a remedy at this juncture. Not only are the current data incomplete, data that are available contradict Illinois EPA's findings.

Response: The National Contingency Plan, 40 CFR 300.430(d), states that the purpose of the remedial investigation is to "collect data necessary to adequately characterize the site for purposes of developing and evaluating effective remedial alternatives." The Southeast Rockford Groundwater Contamination Site is defined by the extent of groundwater contamination with concentrations of total volatile organic compounds above 10 parts per billion. The Illinois EPA defined and characterized the site through a multi-phased remedial investigation based upon Illinois EPA and U.S. EPA approved work plans. Area 9/10 falls within the site boundaries as defined and characterized and is not considered a separate site.

The National Contingency Plan further specifies that the remedial investigation provide information to assess the risks to human health and the environment and to support the development, evaluation and selection of appropriate response alternatives. The data collected during the groundwater and the source control operable units were used to conduct a risk assessment that accurately and effectively evaluated risks to human health and the environment from not only the site-wide groundwater, but also from each of the source areas.

As mentioned in the Source Control Proposed Plan, data regarding risks from Area 9/10 were not as detailed as data from other areas. Sundstrand (now Hamilton Sundstrand) limited Illinois EPA access to their property so that the Agency was not able to collect additional data where file information indicated potential sources of contamination might be located. Nevertheless, there are sufficient data from soil gas survey and groundwater monitoring well results (both upgradient and downgradient of Area 9/10) complemented by information from Illinois EPA's files regarding past handling practices and possible releases of contaminants on the property, to support the selection of the soil and leachate remedies for Area 9/10.

The need for the Area 9/10 soil remedy was based upon the U.S. EPA presumptive remedy process. The U.S. EPA has developed presumptive remedies for some contaminants that are commonly found at hazardous waste sites and with which they have extensive experience in successfully implementing remedies. VOCs are one class of these contaminants. U.S. EPA has designated soil vapor extraction as the presumptive remedy for VOCs in soil. The Illinois EPA followed U.S. EPA guidance on presumptive remedies in determining that the presumptive remedy for VOCs in soil, soil vapor extraction, is appropriate for the Area 9/10 soil remedy.

The need for the Area 9/10 leachate remedy is documented in the Source Control Record of Decision and is supported by results from a monitoring well downgradient of Area 9/10 showing 1,000 times higher contaminant concentrations than the upgradient monitoring well. Illinois EPA files show that contaminants of concern, which include VOCs, exist at concentrations that pose a risk of contaminating groundwater above the Class I Groundwater Standards.

65. Comment: Given the lack of adequate site characterization and the inherent complexities and liabilities associated with the construction of the proposed remedy for Area 9/10, United Technologies Company/Hamilton Sundstrand (UTC/HS) cannot agree to implement the remedy without further study and analysis. Therefore, UTC/HS requests that the Agencies defer remedy selection for Area 9/10 until these critical issues are resolved.

Response: It is true that the Illinois EPA would have preferred to collect more data from Source Area 9/10, but Sundstrand (later to become Hamilton Sundstrand whose parent company is United Technologies), limited the Illinois EPA's access to the site and additional data collection was not possible. Nevertheless, the data that were collected indicate substantial contamination on the Hamilton Sundstrand property and are sufficient to choose a soil and a leachate remedy for the site. Illinois EPA files show that contaminants of concern, which include VOCs, exist at concentrations that pose a risk of contaminating groundwater above the Class I Groundwater Standards.

66. Comment: Given the need for additional site characterization and remedy evaluation, UTC/HS is prepared and willing to conduct additional site characterization activities in close coordination and cooperation with the Illinois EPA and U.S. EPA, within the limitations dictated by operational and safety considerations at Area 9/10. These activities would focus on resolving the site characterization, analysis and feasibility study issues, including a mutual effort to resolve the outstanding regulatory issues. In addition, UTC/HS is willing to undertake soil remediation at the Outdoor Storage Area after the completion of the necessary characterization and pre-design studies.

UTC/HS shares the Agencies' commitment to protect human health and the environment. Towards that end, UTC/HS will commit to an immediate, responsible dialog with the Agencies to assist in moving forward to a consensus.

Response: The Illinois EPA appreciates UTC/HS's offer to conduct activities in cooperation with the Illinois EPA and U.S. EPA. The appropriate procedure for coming to agreement about the nature of these activities is through negotiations.

Further, pursuant to Fall 2001 discussions between and Illinois EPA, and UTC/HS, it is understood that a specific Remedial Design (RD) for Area 9/10 will be approached, initially, through cooperative use of the Superfund Administrative process.

IMPACT OF UPGRADIENT GROUNDWATER ON AREA 9/10

67. Comment: Given that the upgradient groundwater exceeds Class I standards and continues to flow through Area 9/10, no remedial alternatives contemplated for Area 9/10 could meet Class I standards.

Response: See response to Comment #10. According to the Illinois groundwater regulations (35 IL Adm. Code 620), groundwater upgradient of a source (in this case Source Area 9/10) would not be considered to be the result of contamination originating in Source Area 9/10. Upgradient concentrations are taken into consideration when determining the contamination originating on a property.

68. Comment: Based on the proximity of Area 9/10 and Area 11, characterization of potential migration of contaminants between the two areas was not fully considered with respect to the "masking" of chlorinated VOCs within Area 11.

Response: Illinois EPA information shows that activities conducted at Area 11 were primarily painting and varnishing, activities that at the time of use did not involve the use of chlorinated solvents. In addition, the wells upgradient of Area 9/10 showed lower concentrations of chlorinated VOCs coming into the area compared to the concentrations of VOCs exiting the area. See the response to the previous comment regarding setting remediation goals for leachate leaving Area 9/10.

69. Comment: Data show that groundwater upgradient of Area 4, 9/10 and 11 exceeding Class I standards (public drinking water supply standards) is moving into and impacting groundwater in those three areas. A map entitled Figure 8 "Groundwater Sample Locations Exceeding Class I Standards Nov/Dec 2000" is submitted by the commenter in support of this conclusion. (The map is available at the repositories and is part of Hamilton-Sundstrand's comments).

Response: Figure 8 submitted as a public comment has incorrect information regarding bedrock sampling locations. The wells indicated by the key at the bottom of the map to be bedrock wells are in fact a mixture of bedrock and overburden wells. For example MW 201, MW 202 and MW 203 are not bedrock wells although they have been labeled as such. These three are overburden wells. MW201 was screened just below the water table in order to provide a good indication of contamination potentially entering the groundwater from the surface or near surface. Although some contamination may be moving into Area 9/10, the 1,000 fold increase detected between wells upgradient and downgradient from Area 9/10 supports the Illinois EPA's conclusion that Area 9/10 is a major source of groundwater contamination in the Southeast Rockford Groundwater Contamination Superfund project.

70. Comment: Since Area 7 is a source of contamination in both the unconsolidated (sand and gravel) and consolidated (bedrock) aquifers, the proposed response actions for Area 9/10 will not materially improve deep groundwater conditions such that the aquifer could support unrestricted

use. A map entitled Figure 9 "Bedrock Aquifer Sample Locations Exceeding Class I Standards Nov/Dec 2000" is submitted to support this conclusion.

Response: It should be noted that currently there are no bedrock wells in Area 9/10 to measure bedrock contamination, if any, in Area 9/10. It should also be noted that the Area 9/10 remedies are not designed to materially improve deep groundwater in the 9/10 area. They are designed to control the sources within Area 9/10 to prevent further release of contaminants from Area 9/10 to the aquifer, thus allowing the site-wide groundwater remedy to work more effectively. Based on current data, the Illinois EPA agrees that contamination found in deep bedrock east of Area 9/10 may be due to releases from Area 7, but Figure 9 submitted by the commenter is incorrect. It should be noted that MW 130 is not a bedrock well. Additionally, it is extremely important to note that while MW113, MW101, MW102, and MW133 are screened in the dolomite bedrock aquifer, MW114 B is not. MW 114B is located south and east of Area 9/11 and is screened in the St. Peter sandstone aquifer. Additionally, please refer to Figure 4-32 of the groundwater investigation report (CDM January 1995) for a cross section illustration of the Area 7 groundwater plume moving downgradient. Based on data collected during the groundwater investigation, the sandstone and dolomite aquifers do not appear to be hydraulically connected east of 20th street. Therefore the contamination from Area 7 would be hindered from migrating downward into the sandstone in the vicinity of the Source Area 7. So MW 114A, which is a shallow overburden well in the same location as MW 114B, would be expected to be more contaminated than the bedrock well (MW 114B) due to the confining layer that protects the sandstone aquifer east of 20th Street. The test results of groundwater from these two wells confirm this assumption. See the map on the last page showing the approximate locations of these monitoring wells.

71. Comment: According to the Source Control Proposed Plan, groundwater leaving the groundwater management zone for Area 9/10 is required to meet drinking water standards whereas the groundwater leaving Area 11, while monitored, is not required to meet the same standards. Area 11 is in the same general vicinity as, and upgradient from, Area 9/10. This means that at points downgradient of both Area 9/10 and Area 11, there will be concentrations of trichloroethylene (TCE) that will have met the goal, while there will also be concentrations that have not. The Illinois EPA has not given a justification for allowing this discrepancy.

Response: According to the modeling, the groundwater leaving Source Area 11 will meet drinking water standards. The water will be monitored to see if the modeling is accurate. If the modeling is not accurate, then the leachate remedy will be reevaluated to see if it needs to be modified or changed.

THE CORRELATION BETWEEN SOIL GAS SAMPLES AND SOIL BORINGS IN AREA 9/10

72. Comment: The soil gas iso-concentration maps may not provide an accurate representation of the soil gas concentrations within Area 9/10 due to significant data gaps.

Response: The iso-concentration maps provided in the report on the Illinois EPA focused remedial investigation are a best estimate, based on technical expertise and site knowledge, of the soil gas concentrations in the vicinity of the commenter's facility (Hamilton Sundstrand).

While soil gas concentrations beneath the plant may not have been confirmed through soil testing during the focused remedial investigation, new file information now available helps to confirm the hypothesis that VOC releases have occurred on facility property. See the response to comment #36.

73. Comment: There is little to no correlation between the soil gas data and the soil sample analysis for Area 9/10.

Response: The Illinois EPA acknowledges that there is little correlation between soil gas sample data and soil boring data collected for Area 9/10. However, the concentrations of VOCs in the soil gas in the vicinity of the facility, particularly in the downgradient direction and along utility conduits, still indicate the potential for a VOC source within the Hamilton Sundstrand facility. Unfortunately, soil sample collection was prohibited within much of the facility because of limitation on access, and remedial sampling activities did not pinpoint the actual VOC source location(s). New file data greatly assist with the confirmation of the location of sources of VOC releases within the facility. See also response to comment #36.

It should also be noted that significant VOC sources within soil are difficult to locate within sandy soils and that soil gas often migrates well beyond the immediate source area. Without extensive sampling efforts, it is impossible to rule out soil sources of VOCs.

74. Comment: The discussions about soil gas sampling in the Source Control Remedial Investigation Report, the Feasibility Study and the Proposed Plan leave the incorrect impression that VOCs detected in soil gas measured at Rockford Products Plant 1 and the Rockford Products parking lot are due to contaminated soil on the Rockford Product Plant 1 property and parking lot. Soil boring results show that VOCs are essentially at non-detectable levels at these two locations, clearly showing that the VOCs in the soil gas migrated from the groundwater and not from nearby contaminated soil. Speculations and generalizations about the source of soil gas elevations should be removed or specifically qualified with clear statements that they are not supported by the available technical evidence. Rockford Products believes their comments require retractions of and/or modifications of statements made about Plant 1 and the parking lot.

Response: The Illinois EPA's position is that statements in the Source Control Remedial Investigation Report, Source Control Feasibility Study and Source Control Proposed Plan give clear interpretations of the data available in Area 9/10 including discussions about the limitations of the data. Based on current information, the Illinois EPA does not think that there are major sources of contamination in the Rockford Products Plant 1 property or parking lot contributing to the overall groundwater contamination of the Southeast Rockford Groundwater Contamination Superfund project area.

75. Comment: The same comment holds true for samples of three soil borings in the north end of the parking lot that show no significant detections of chlorinated VOCs, benzene, ethylbenzene, toluene or xylene. Speculations and generalizations about the source of soil gas elevations should be removed or specifically qualified with clear statements that they are not supported by the available technical evidence.

Response: See response to the previous comment.

COMPARISON OF PAST AND PRESENT DATA IN AREA 9/10

76. Comment: The data collected by the Illinois EPA, which is the basis for the Source Control Proposed Plan, were collected primarily in 1995 and 1996. More recent data collected by the City of Rockford under the terms of the consent decree indicate significant differences in the concentrations and distribution of groundwater impacts throughout the study area. The new data indicate that the characterization presented in the Administrative Record does not represent current conditions.

Response: The Illinois EPA assumes that the recent monitoring data being referred to in this comment are groundwater data only since the City of Rockford is not gathering soil data. With that understanding, the Illinois EPA acknowledges that data from 1995 and 1996 may not compare exactly to current conditions. The Illinois EPA also expects that the dynamics of the groundwater contamination plume will change over time as the contaminants migrate through the subsurface. The reasons for these changes could be due to many different external factors such as precipitation events, groundwater flow directions, contaminant source locations and contaminant source concentrations. However, the Illinois EPA's position is that the commenter has not provided any new data documenting significant changes between the groundwater conditions in 1995 and 1996 and the present. The two groundwater contaminant plume maps provided by the commenter (entitled "Figure 5 Total VOC Concentrations in Groundwater 1995 ROD Data" and "Figure 7 Total VOC Concentrations in Groundwater 2000 Sample Data") cannot be directly compared because the same wells were not used to prepare Figure 5 and Figure 7. For example:

- Eight new wells installed after the preparation of Figure 5 are included on Figure 7,

- MW 201, which was placed hydraulically downgradient of a suspected source in Area 9/10, is shown in its original location in Figure 5 and in a different location in Figure 7. Monitoring well MW 201 was destroyed and moved to a new location approximately 50 feet north of the original location. The original location of MW 201 was surveyed and coordinates are available in the 1995 Groundwater Remedial Investigation Report appendices. The Resource Conservation and Recovery Act (RCRA) requires that any monitoring well replacement be installed within 10 feet of the original location. Moving the well 50 feet from its original location in a very transmissive aquifer has likely resulted in a monitoring point that is in a different zone of the contaminant plume. This conclusion is justified based on a review of the data collected by Illinois EPA during the Groundwater and Source Control Remedial Investigations and by the City of Rockford as required by the 1998 Amended Consent Decree. It is the opinion of the Illinois EPA that the current location of MW 201 does not constitute a replacement for the original MW 201 but provides a different monitoring point. This new location, shown on Figure 7, is potentially side gradient to the suspected source area. A monitoring well log and surveyed coordinates should be provided for this new well, and an adequate justification for moving the well to its present location should be given. At this time, the groundwater data from the original MW 201 and the newly installed MW 201 are not directly comparable. Therefore, while the current groundwater sampling results can be evaluated regarding current conditions, there is a data gap in the vicinity of the original MW 201.

- It is evident that upon comparison of data from other wells in Area 9/10, that contaminant concentrations have changed over time, some decreasing, some increasing. However, none of the changes are of the same magnitude as that observed between the original MW 201 data and the data from the current MW 201 location. Since the two maps provided by the commenter show different wells with different locations, one would expect the two maps to show different concentrations and distribution of contaminants. These differences do not necessarily document a change in groundwater conditions over time.

77. Comment: Modeling the expected migration of compounds recently detected in MW 201 indicates that Class I standards would be achieved within the proposed groundwater management zone boundary without any further remedial action.

Response: See the response to the previous comment regarding lack of current data from the original location of monitoring well MW 201 and the inappropriateness of comparing data from the original monitoring well MW 201 location with data from the current monitoring well MW 201 location.

78. Comment: The Illinois EPA used data collected after the initial field investigation efforts in 1995 and 1996 to further characterize Area 7. Based on this precedent, the data collected by the City of Rockford from the site-wide groundwater monitoring program, after 1996 should also be fully utilized to adequately characterize current site conditions.

Response: Current data will likely be used in conjunction with additional data to be collected to support the design of the selected remedy for Area 9/10.

79. Comment: The current distribution of VOCs does not support the Illinois EPA's contention that Area 9/10 is a significant source of VOC releases to area groundwater.

Response: In 1996, concentrations of VOCs in MW 201, which is downgradient from Area 9/10, were over 1,000 times the concentration of total VOCS present in the two wells upgradient of Area 9/10 (monitoring wells MW 202 and MW 203.) As noted in the response to comment #76, MW 201 was moved and is likely now located side gradient to a potential source in Area 9/10. Even with this change in monitoring well location, the current City of Rockford groundwater monitoring data show that the downgradient groundwater concentration of total VOCs is 50 times greater than the upgradient concentration. The Illinois EPA's position is that current information, even though it contains no data from the original location of MW 201, confirms that Area 9/10 contains a significant source that does release VOCs to the groundwater.

THE PRESENCE OF NON-AQUEOUS PHASE LIQUID (NAPL) IN AREA 9/10

80. Comment: The Illinois EPA identified the groundwater sample result from MW 201 from the 1996 sampling event as proof that a non-aqueous phase layer (NAPL) is present in Area 9/10, constituting a "principle threat" requiring a leachate control remedy. The data that Illinois EPA is using are outdated. Current data indicate there is no basis to conclude that NAPL is present

and therefore, there is no basis for the Illinois EPA to conclude that a remedial response at Area 9/10 is necessary in order to protect human health and the environment.

Response. See response to comment #76 regarding the inappropriateness of comparing data from the original monitoring well MW 201 location with data from the current MW 201 location.

81. Comment: The assumption that non-aqueous phase liquid (NAPL) is probably present in Area 9/10 subsurface soils is not supported by the technical evidence for two reasons: (1) The testing of monitoring well MW 201 and the soil borings SB 202 and SB 205 were negative. (2) The concentrations in MW 201 are not high enough to meet the rule of thumb that NAPL might be a concern if the concentration of a compound in groundwater reaches one percent of its solubility. The solubility of 1,1,1-trichloroethane (TCA) is 4,400,000 parts per billion at 20 degrees centigrade (Handbook of Environmental Data on Organic Chemicals, Second Edition, p. 1192, Van Nostrad Reinhold). One percent of 4,400,000 parts per billion is 44,000 parts per billion. Concentrations of TCA in MW 201 are almost four times less than the rule of thumb number.

Response: The Illinois EPA reaffirms its conclusion of the likelihood of NAPL in Area 9/10 for the following reasons:

- Calculations of solubility vary widely depending upon conditions. The value of 4,400,000 parts per billion cited from the Handbook of Environmental Data on Organic Chemicals is at the very high end of a range of values for the solubility of TCA. The Groundwater Chemicals Desk Reference (Montgomery, 1996) gives a range of aqueous solubility of TCA from 300,000 to 1,550,000 parts per billion. Using one percent of the solubility of a chemical as a guide for determining the presence of NAPL, the presence of TCA NAPL would be indicated if it were present in groundwater in concentrations varying from 3,000 to 15,500 parts per billion depending upon what solubility value is used. TCA was found in monitoring well MW 201 (original location) at 12,000 parts per billion, therefore indicating the presence of NAPL.

- As stated in the Source Control Remedial Investigation Report, dense non-aqueous phase liquid (DNAPL) would not be expected to be present in the shallower portions of the unconsolidated aquifer in the vicinity of Area 9/10, because the soil is sandy and contaminants would sink through the sand. Data from an Illinois State Geological Survey well indicate that the first confining layer (material through which contaminants cannot easily sink) is a clay layer at 120 feet beneath ground surface near the intersection of 9th Street and Harrison Ave. The soil boring SB 202 referenced in the above comment ended at 80 feet below ground surface and the referenced SB 205 ended at only 55 below ground surface. Monitoring well MW 201 (original location) was screened (the opening in the casing through which water is allowed into the well) between 36 and 46 below ground surface. The elevated concentration of TCA detected in MW 201 (original location) in 1996 is indicative of a DNAPL that may have been present below the screened interval of MW 201 (screened at 36-46 feet), possibly located on the clay unit found about 120 feet below ground surface in that area. As has been stated in numerous guidance documents and publications regarding site characterization for DNAPL, "The ultimate path taken by DNAPL can be very

difficult to characterize and predict." (Estimating Potential for Occurrence of DNAPL at Superfund Sites, U.S. EPA Publication: 9355.4-07FS).

- Illinois EPA also has information from the RCRA corrective action begun but not completed by Sundstrand that show perchloroethylene (PCE) in the soil at concentrations high enough to indicate the presence of NAPL. By following the procedure outlined in the previously cited U.S. EPA document, the potential for DNAPL to be present at the site is high to moderate. The potential was evaluated by answering the following two questions: (1) Does historical use indicate the presence of DNAPL? (2) Do characterization data indicate the presence of DNAPL?

  The first question was answered by evaluating other questions within a flow chart in the publication referenced above (p. 4). The question second from the top of the flow chart is: "Does a process or waste practice employed at the site suggest a high probability of historical DNAPL release?" An answer of "yes" to the above question is regarded as a "yes" to the overall historical site use question. Table 2 in the document lists "storage of solvents in underground storage tanks" as one of the waste practices that suggest a high probability of historical DNAPL release. Solvent releases from an outdoor hazardous waste storage area and an associated corroded waste solvent tank located at the former Plant #2 were documented in a request for RCRA closure in 1993. This is clearly an answer of "yes" to the first question.

  The second question relies on a set of four conditions, any of which can indicate the presence of DNAPL. The conditions are as follows:

  Condition 1: Concentrations of DNAPL-related chemicals in groundwater are greater than one percent of pure phase solubility or effective solubility.

  Condition 2: Concentrations of DNAPL-related chemicals in soils are greater than 10,000 parts per million.

  Condition 3: Concentrations of DNAPL-related chemicals in groundwater calculated from water/soil partitioning relationships and soil samples are greater than pure phase solubility or effective solubility.

  Condition 4: Concentrations of DNAPL-related chemicals in groundwater increase with depth or appear in anomalous up-gradient/across gradient locations.

  Currently, there are insufficient data to evaluate conditions 1, 2 and 4 due to the lack of deep groundwater data and soil data. Condition 3 was evaluated using the data from the RCRA corrective action begun but not completed by Sundstrand and is shown in the following table.

Parameter	Value	Units	Source
Log Koc	2.35-2.94	Log (L/kg)	
foc	0.002	Mass fraction	Typical for sandy soil
C_{soil}	3,500 (trench 2) 2,900 (VE4)	Mg/kg (parts per million)	Measured values
Solubility of PCE	150	mg/L (parts per million)	Verschueren (1983)

The concentration of PCE that would partition to groundwater (C_{water}) is calculated using the following equation:

$$C_{water}\ (mg/L) = C_{soil}\ (mg/kg)/(Koc * foc)$$

Using the maximum Koc value and the lower of the two PCE concentrations provides a conservatively low PCE concentration in water as follows:

$$C_{water}\ (mg/L) = 2{,}900\ mg/kg/(0.002*871\ L/kg) = 1665\ mg/L$$

Because the concentration of PCE predicted to partition to water is greater than the solubility of PCE in water (150 mg/L), condition 3 is met and the probability for NAPL at the site is moderate to high.

USE OF TACO IN AREA 9/10

82. Comment: The need for groundwater-related response actions at Area 9/10 should be reevaluated in accordance with 35 IAC 742 rules and regulations (Tiered Approach to Corrective Action Objectives or TACO).

Response: The TACO regulations apply to sites in the Illinois EPA Site Remediation Program, not to sites, such as the Southeast Rockford site, that have been placed on the National Priorities List (NPL). The U.S. EPA does not consider TACO rules and regulations an applicable or relevant and appropriate requirement (ARAR) for NPL sites, because even though the TACO regulations have been promulgated they are not enforceable.

83. Comment: TACO should be used to exclude pathways of exposure[1] specifically the groundwater exposure pathway. The Illinois EPA TACO Fact Sheet #1 states, "human exposure route(s) can be excluded from further consideration provided the requirements in Subpart C of TACO are met. The human exposure routes are inhalation, soil ingestion and groundwater ingestion (including migration to groundwater). Exclusion of an exposure route will require an institutional control." The Illinois EPA TACO Fact Sheet #8 summarizes the Subpart C requirements to exclude a pathway as follows:

---

[1]An exposure pathway is the means in which humans can be exposed to contaminants. For example, humans can be exposed to contaminants by drinking, cooking and/or bathing in groundwater that contain contaminants.

- Free product has been removed to the extent practicable.
- The source of the release is not within a setback zone or a regulated recharge area of a potable water supply well.
- All areas within 2,500 feet of the source of the release are governed by an ordinance adopted by a unit of local government that prohibits the use of groundwater as a potable supply.
- Using equation R26 in Appendix C, Table C, all contaminants will meet the Tier I objective at the nearest setback zone.

Response: See response to previous comment regarding the applicability of TACO.

MISCELLANEOUS COMMENTS AND QUESTIONS ABOUT AREA 9/10

84. Comment: The slides shown at the hearing indicate that a remediation well would be on Hamilton Sundstrand property. Is this correct?

Response: The locations of the soil vapor extraction wells needed for the remedy have not been finalized. Because of limited access in Area 9/10, the investigation was not as thorough as the investigation in the other three areas. Before the Area 9/10 remedy is actually designed and the locations of the extraction wells are determined, more investigation will have to be conducted to more precisely identify the location of contamination. Based on current data, extraction wells will be placed on Hamilton Sundstrand property, but additional data may show that the wells need to be moved.

85. Question: Is it possible for the Illinois EPA and the U.S. EPA to give a "clean" letter for the building located on the corner of 23rd Avenue and 11th Street?

Response: A "clean letter" cannot be given to owners of properties within the four source areas until the remedial action has been successfully completed. However, there are three possible methods by which owners of property within the four source areas could perhaps provide assurances to prospective purchasers of their property.

1. Certain businesses may be covered by the Small Business Liability Relief and Brownfields Revitalization Act recently signed by President Bush. In general, certain businesses purchasing property may be covered by the *bona fide* prospective purchaser provisions of that act. These provisions provide certain protections of businesses from liability for contamination present on the property at the time of purchase (if certain conditions are met).

2. Other businesses interested in purchasing property within the four source areas and who meet specific criteria could approach the U.S. EPA, Region 5, about possibly negotiating a Prospective Purchasers Agreement. Such agreements have been used by parties to assure them that they would not be liable for contamination on property they purchase as provided in the agreement, if that contamination were present at the time of purchase.

3. The 1999 amended consent decree and 2001 second amendment to the consent decree

between the City of Rockford and the State of Illinois and the U.S. Government provided eligible area property owners certain releases of liability for contamination. Eligible area property owners are "covenant beneficiaries" as defined by that decree. These releases do not apply to contamination originating on one's own property with the exception of property in Area 7. In certain circumstances, these releases of liability can be transferred to a subsequent purchaser, lessee or mortgagee of the property. For more information about the releases and the eligibility for these releases see Section VIII "Covenants not to Sue by Plaintiffs" in the 1999 amended consent decree. A copy of both decrees has been placed in the repositories listed on the back of this document.

86. Comment: Rockford Products requests that their comments be included in the Administrative Record for the project and that all information provided in recognition of, or response to, these comments also be placed in the Administrative Record.

Response: The federal Comprehensive Environmental Response, Compensation and Liability Act (the "Superfund" law) requires that all comments submitted to the Illinois EPA within the designated comment period, including oral comments given at the public hearing, be part of the Administrative Record for this project. In accordance with this federal requirement, the written comments submitted by Rockford Products within the designated comment period will be incorporated into the Administrative Record. This responsiveness summary is a summary of the Agencies' responses to public comments received during the public comment period. It will be placed in the Administrative Record.

Area 11

87. Question: We have Area 11 for lease. Would the remedy proposed for Area 11 interfere with business operations?

Response: The intent of Illinois EPA and the is that the construction and operations of the remedy will cause as little interference as possible with business operations. The soil vapor extraction system proposed for Area 11, with the exception of the treatment building, would be primarily below ground and should not disrupt business operations after it is constructed. The treatment building, of course, will take up space.

88. Question: Since it appears that the source of contamination at Area 11 is from the old paint factory on the southern part of the property, would the Illinois EPA and the U.S. EPA give purchasers of the property a "clean letter" saying that no further remediation would be required of the purchase?

Response: The same response given to comment #85 applies to this question.

GLOSSARY

Applicable or Relevant and Appropriate Requirements (ARARs). Any state or federal statute or requirement that pertains to protection of human life and the environment in addressing specific conditions or use of a particular cleanup technology at a Superfund site. The National Contingency Plan requires that remedies at Superfund sites meet nine criteria. One of these criteria is that the remedy complies with ARARs.

Comprehensive Environmental Response, Compensation and Liability Act (CERCLA). The federal law (commonly called the Superfund law) passed in 1980 and amended in 1986 to provide procedures and funds to investigate, and if necessary, to remedy the nation's most serious hazardous waste sites.

Downgradient. A physical location where water is present at a lower elevation. Water flows "downhill" or downgradient.

IDPH. Illinois Department of Public Health.

Illinois EPA. Illinois Environmental Protection Agency.

National Contingency Plan (NCP). The regulations implementing the Comprehensive Environmental Response, Compensation and Liability Act.

Operable Unit. Term for each of a number of separate activities undertaken as part of a Superfund site cleanup. For example, in this project, connecting properties that had private well water violating public water standards was one "operable unit". A second operable unit was investigating the extent of groundwater contamination and deciding on an area-wide groundwater remedy. This operable unit focuses on defining and remedying the four major sources of groundwater contamination.

Resource Conservation and Recovery Act (RCRA). A federal law passed in 1976 that regulates the handling and disposal of hazardous waste.

Record of Decision (ROD). The document, signed by the Director of the Illinois EPA and the Administrator of U.S. EPA, Region 5, that records the decision about a remedy for an Illinois Superfund site.

Superfund Site. The common name given to sites on the National Priorities List (NPL). The NPL is a list of the nation's most hazardous sites that are eligible for investigation and, if necessary, a remedy under the federal Superfund law. (See "CERCLA" above.) The Southeast Rockford Groundwater Contamination Superfund Site was placed on the NPL in 1989.

Tiered Approach To Corrective Action Objectives (TACO). TACO is an unenforceable method described in the State of Illinois Administrative Codes for developing remediation (cleanup or corrective action) objectives for contaminated soil and groundwater. This method is used for sites in the State Remediation Program but is not considered a requirement for sites on the Federal National Priorities List (Superfund), because TACO is not enforceable. Other methods have been developed by the U.S. EPA to develop corrective action objectives for federal Superfund sites.

Upgradient. A physical location where water is present at a higher elevation. See the definition of "downgradient".

U.S. EPA. United States Environmental Protection Agency.

Volatile Organic Compound (VOC). A chemical compound that evaporates (volatilizes) readily and that contains carbon (is organic).

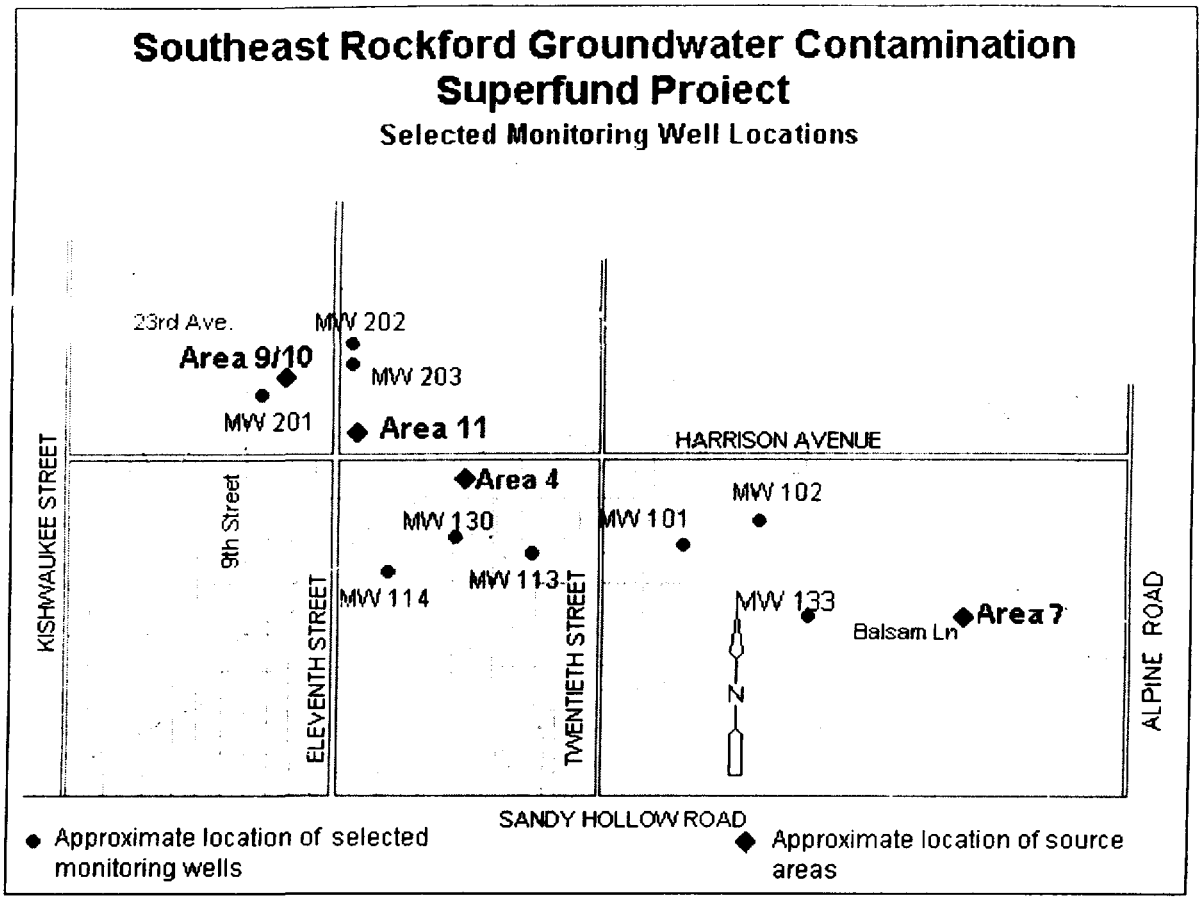


Figure 1

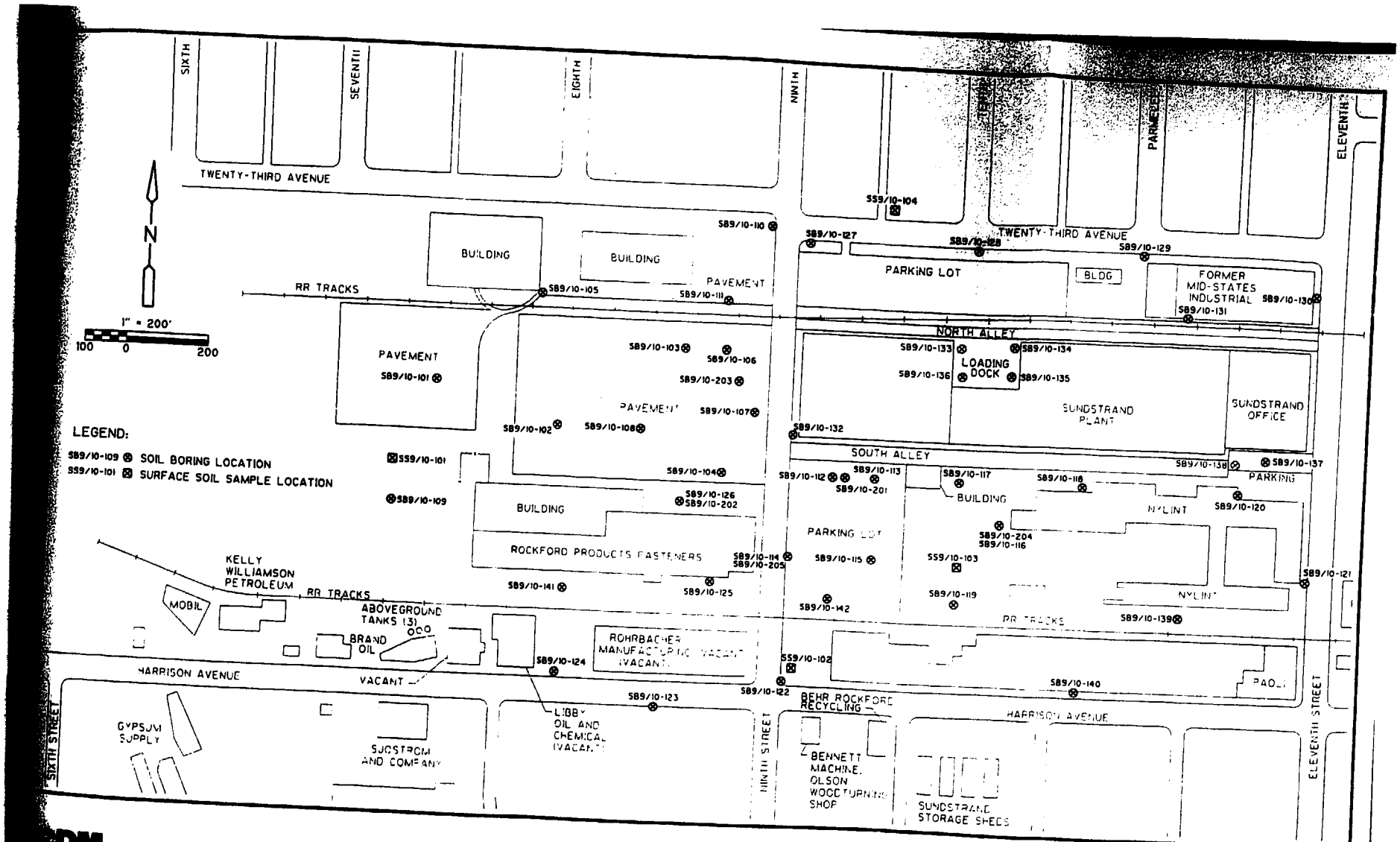
For More information

Contacts. You may contact Virginia Wood, Illinois EPA Community Relations Coordinator, or Thomas Williams, Illinois EPA Project Manager, at 1021 North Grand Ave. East; P.O. Box 19276, Springfield, IL 62794-9276. Virginia Wood's e-mail address is Virginia.Wood@epa.state.il.us and her telephone number is 217/785-1269. Thomas Williams' e-mail address is Thomas.Williams@epa.state.il.us and his telephone number is 815/223-1714.

Repositories. The Illinois EPA has placed the full remedial investigation report, feasibility study, proposed plan, record of decision and other project information in two locations. The first is the Ken-Rock Community Center, 3218 South 11th Street in Rockford. The second location is the Rock River Branch of the Rockford Public Library, 3128 South 11th Street in Rockford.

Administrative Record File. The administrative record file contains all documents upon which project decisions are based. This file is located in the Springfield Office of the Illinois EPA. Call for an appointment at 217/782-9878. A copy of the Administrative Record File is on microfiche located at the main branch of the Rockford Public Library, 215 N. Wyman Street in Rockford.

Appendix B



SOUTHEAST ROCKFORD
SOURCE CONTROL OPERABLE UNIT

AREA 9/10 SOIL BORING AND SURFACE SOIL SAMPLE LOCATIONS

Figure No. 3-32

Appendix C

STATEMENT OF WORK FOR REMEDIAL DESIGN
[Southeast Rockford Source Control Operable Unit, Rockford, Illinois]

UTC/HS Portion - Area 9/10

Introduction

Site Description

Beginning in the mid-1980s, a sizable plume of contaminated groundwater was identified in the southeast Rockford area. Effort was made by both the U.S. EPA and Illinois EPA to provide clean drinking water supplies for affected areas. The agencies initially provided bottled water or filters at the tap for residences/businesses. Later, initial remedial steps were taken to extend municipal water mains and provide hook-up to the City of Rockford municipal water supply. Action memoranda in the late 1980s and early 1990s, and the first Record of Decision (ROD) prepared in 1991, memorialized this activity.

A second ROD, prepared in 1995, established the goal of continued municipal water supply hook-up. Between agencies removal/remedial actions, plus actions undertaken by the City of Rockford, several hundred residences and businesses have been connected to the municipal water supply. Additionally, the second ROD established the goal of aquifer restoration. The technique of overall aquifer restoration is to be accomplished through natural attenuation of the plume with monitoring. However, to reduce the time needed to achieve restoration, study also indicated the desirability of reducing future contamination input to the plume through controlling significant source areas.

A ROD for source control measures for the third and final operable unit for the Southeast Rockford Groundwater Contamination site was issued June 11, 2002. This source control ROD discusses actions to be taken at four areas believed by the U.S. EPA and Illinois EPA to be the major potential plume contributors.

One of these four areas, and the subject of this Statement of Work (SOW), is known as Area 9/10. Area 9/10 is an industrial area that is bounded by Eleventh Street on the east, Twenty-third Avenue on the north, Harrison Avenue on the south, and Sixth Street on the west. Area 9/10 has a considerable history of industrial activity that extends back as far as 1926 when the Rockford Milling Machine and Rockford Tool companies merged to become the Sundstrand Machine Tool Company. In recent years, United Technologies Corporation acquired Sundstrand. Other industries operating

in Area 9/10 are Rockford Products Corporation, J.L. Clark, and Paoli Manufacturing. Industries that had been manufacturing, but no longer appear to be in operation, are Nylint Corporation, Rohrbacher Manufacturing, and Mid-States Industrial.

Primary contaminants of concern associated with Area 9/10 are volatile organic contaminants, or VOCs. Such VOCs include, but are not necessarily limited to compounds such as 1,1,1-trichloroethane, 1,2-dichloroethylene, and 1,1-dichloroethane.

Purpose

The purpose of this SOW is to set forth the requirements for the Remedial Design (RD) of the soil remedy portion of the selected remedy as defined in the ROD issued on June 11, 2002, for Area 9/10 to be performed by United Technologies Corporation/Hamilton Sundstrand (UTC/HS). The RD is generally defined as those activities to be undertaken by the contractor to develop the final plans and specifications, general provisions, and special requirements necessary to translate the ROD into the remedy to be constructed under the remedial action (RA) phase. The RA is generally defined as the implementation phase of site remediation or construction of the remedy, including necessary operation and maintenance, performance monitoring, and special requirements. For the United Technologies/Hamilton Sundstrand portion of Area 9/10, execution of the RA phase will be the subject of separate discussion and enforcement vehicle usage. The RA is based on the RD to achieve the remediation goals specified in the ROD.

General Requirements

The respondent shall conduct the RD in accordance with this SOW and consistent with the ROD issued on June 11, 2002, the *Remedial Design/Remedial Action (RD/RA) Handbook* (U.S. EPA Office of Solid Waste and Emergency Response (OSWER), 9355.0-04B, EPA 540/R-95/059, June 1995)

A summary of the major deliverables and a suggested schedule for submittals are attached (Attachment 1).

Specifically, the RD involves the gathering of supplemental information concerning Area 9/10 environmental characteristics, the design of soil vapor extraction equipment supplemented as necessary with air sparging capability, and the opportunity to address other potentially highly contaminated subareas which if revealed may be best addressed through limited excavation and/or free-product collection efforts.

The respondent shall furnish all necessary and appropriate personnel, materials, and services needed for, or incidental to, performing and completing the RD.

A list of primary guidance and reference material is attached (Attachment 2). In all cases, the respondent shall use the most recently issued guidance.

The estimated cost of the RA for the entire Area 9/10, as outlined in the ROD, is approximately $3,071,000 in terms of capital with annual operation and maintenance costs estimated at $320,000.

U.S. EPA will provide oversight of respondent activities and review and approve of deliverables throughout the RD. Illinois EPA will provide support to the U.S. EPA to assist this process and to satisfy, in part, the agencies' responsibility to provide effective protection of public health, welfare, and the environment. U.S.EPA/ Illinois EPA will review deliverables to assess the likelihood that the RD will achieve its remediation goals and that its performance and operations requirements have been correctly identified. Acceptance of plans and specifications by the agencies does not relieve the respondent of responsibility for the adequacy of the design.

Task 1 Project Planning and Support

1.1 Project Planning

This task includes efforts related to project initiation.

1.1.1 Evaluate Existing Information

The respondent, in preliminary discussions with U.S. EPA and Illinois EPA concerning SOW concepts, has evaluated certain historical information associated with past Area 9/10 tank installation and removal, container storage areas associated with former operations, and current facility operations which might contribute to source release. This evaluation was included as pages 5-9 of a November 20, 2001 UT/HS document sent to the agencies and is included as SOW Attachment 3. The respondent shall continue to evaluate other pertinent existing information in an effort to refine knowledge of past releases and appropriate sampling areas. U.S. EPA makes note of documents such as RCRA/UST file reports, in particular those units discussed in July 27, 1992 correspondence from Illinois EPA to Sundstrand Aerospace and records obtained from the Illinois Fire Marshals Office, etc., as well as the June 11, 2002 ROD. Highlights of such evaluation, and how such evaluation may affect RD project tasks and procedures noted below, will be described in the Narrative section of the RD Work Plan. Evaluation will consider probability of past releases of contaminants of concern at Area 9/10 in potentially migrating downward through soils to groundwater and forming pockets of non-aqueous phase liquids (NAPLs), and how potential zones of accumulation of such NAPLs will be investigated. Such evaluation will also consider response made to information sought in item #9 of a letter dated January 31, 2002 from Illinois EPA to respondent.

1.1.2 RD Work Plan

1.1.2.1 Develop RD Work Plan

The respondent shall prepare and submit a RD Work Plan within 30 calendar days after signature of the Administrative Order on Consent.

Develop Narrative

The RD Work Plan shall include a comprehensive description of project tasks, the procedures to accomplish them, project documentation, and project schedule. Specifically, the Work Plan shall include the following:

- Identification of RD project elements including planning, design, and activity reporting documentation; supplemental characterization and related field sampling and analysis activities, and pilot study activities.

- The respondent's technical approach to each task to be performed, including a detailed description of each task; the assumptions used; any information to be produced during and at the conclusion of each task; and a description of the work products that will be submitted to USEPA. Information shall be presented in a sequence consistent with SOW.

- A schedule with specific dates for completion of each required activity and submission of each deliverable required by the SOW. This schedule shall also include information regarding timing, initiation, and completion of all critical path milestones for each activity and deliverable and the expected review time for USEPA.

1.1.2.2 Prepare Revised Work Plan (*if necessary*)

1.2 Preparation of Site-Specific Plans

1.2.1 Develop Health and Safety Plan.

Prepare a site-specific HASP that specifies employee training, protective equipment, medical surveillance requirements, standard operating procedures, and a contingency plan in accordance with 40 CFR 300.150 of the NCP and 29 CFR 1910.120 1(1) and (1)(2). A task-specific HASP must also be prepared to address health and safety requirements for site visits.

1.2.2 Develop Sampling and Analysis Plan

1.2.2.1 Quality Assurance Project Plan.

The respondent shall prepare a Quality Assurance Project Plan (QAPP) in accordance with EPA QA/R-5 (latest draft or revision) and the Region V Model QAPP guidance. The QAPP shall describe the project objectives and organization, functional activities, and quality assurance/quality control (QA/QC) protocols that shall be used to achieve the desired Data Quality Objectives (DQOs). The DQOs shall, at a minimum, reflect use of analytical methods for identifying contamination and addressing contamination consistent with the levels for remedial action objectives identified in the National Contingency Plan. The QAPP developed for the RI/FS should be referenced or adapted whenever possible when preparing the QAPP for the RD. The data quality objectives proposed for the Remedial Design will indicate that the data will be used for design purposed, thereby warranting a reduced level of documentation and validation as appropriate.

1.2.2.2 Field Sampling Plan.

Prepare a Field Sampling Plan (FSP) that defines the sampling and data collection methods that shall be used for the project. The FSP shall include sampling objectives; sample locations and frequency; sampling equipment and procedures; sample handling and analysis; and a breakdown of samples to be analyzed through the Contract Laboratory Program (CLP) and through other sources, as well as the justification for those decisions. The FSP shall consider the use of all existing data and shall justify the need for additional data whenever existing data will meet the same objective. The FSP shall be written so that a field sampling team unfamiliar with the site would be able to gather the samples and field information required. The FSP developed for the RI/FS must be referenced or adapted whenever possible when the FSP is prepared for the RD; the respondent shall document any required changes to the FSP in a memorandum to the U.S. EPA/Illinois EPA.

1.3 Project Management

1.3.1 Monthly Project Management and Reporting

The respondent shall provide management and coordination to implement the SOW. The respondent shall prepare monthly progress reports in accordance with the requirements under the AOC.

1.4 Support Activities and Procurement

1.4.1 Identification and Procurement of Support Services

Respondent shall procure necessary supporting contractor/consultant services, which may include, but are not limited to the following:

Drilling, surveying, geophysical/remote sensing, site preparation/earth moving, analytical services, RD-derived waste management/disposal services, pilot test services

Task 2 Community Relations Technical Assistance

This task includes technical assistance provided by the respondent during any necessary associated community relations work. The respondent shall provide community relations support to U.S. EPA/Illinois EPA as may be otherwise noted in the AOC.

Task 3 Data Acquisition

Data acquisition entails collecting environmental samples and information required to support the RD. The planning for this task is accomplished in Task 1 - Project Planning and Support, which results in the plans required to collect the field data. Data acquisition starts with EPA's approval of the FSP and ends with the demobilization of field personnel and equipment from the site.

The respondent shall ensure that the following field activities or combination of activities for data acquisition are performed in accordance with the EPA-approved FSP and QAPP developed in Task 1.

3.1 Mobilization and Demobilization

3.1.1 Identify Field Support Equipment, Supplies, and Facilities

3.1.2 Mobilization

3.1.2.1 Site Preparation

Discuss what site preparation steps, such as clearing and grubbing, earthwork, etc., are perceived as necessary to accomplish remedial design tasks.

Discuss likelihood of need to establish field trailer and attendant utilities/facilities for UT/HS consultant/respondent in performance of additional characterization work. If such facilities are necessary, describe such utilities/facilities briefly, and focus on appropriate management of RD characterization-derived wastes. Discuss whether RD-derived wastes will receive separate physical management, or would they be added to wastes stored in plant facility.

The site preparation activities for the initial portion of the RD effort, will require the establishment of a support location of either existing space within the plant complex or the use of a mobile office trailer. Because the site is predominantly paved or covered by buildings, there is no need for clearing/grubbing or other site earthwork preparations. At this time it is anticipated that characterization and investigation derived wastes will be managed separately from plant operational wastes. Characterization and

management will be undertaken to as not to create conflicts with RCRA non-TSD regulations should such wastes be generated.

3.2 Field Investigation

The respondent shall conduct environmental sampling which includes the following:

Discussion - In preliminary discussions between UTC/HS and the agencies which explored RD concepts, material was submitted by UTC/HS in a November 20, 2001 document subtitled "Phase I Characterization", pages 10-14. Accompanying this discussion were Figures 1 and 2. These materials are incorporated into this SOW as Attachment 3. In summary, Attachment 3 suggests that additional characterization work take place in the vicinity of the (former Plant #2) Outside Storage Area (OSA), the current Plant #1 Loading Dock Area (LDA), and a former Waste Recycling Area (WRA) within Plant #1. Other plant areas, where in the past tank installation /subsequent dismantlement went on, or other production work which could have caused a release was conducted, may have been out door at the time of such activity but have now been incorporated within the expanding plant facility. Hence, it is expected that sampling will be more intensive in the vicinity of such current outdoor areas of concern as the OSA and LDA. To help gauge possible release from former areas of concern - in some cases since dismantled and at any rate remnants of which would now be located within Plant #1 in difficult to access areas - sampling is proposed in periphery downgradient areas such as the South Alley. Possible pollutant movement onto the UTC/HS portion of Area 9/10 site will be examined through soil and groundwater sampling in the vicinity of the former Mid-States facility.

Investigation efforts at Area 9/10 will include performance of soil borings to facilitate the collection of discreet soil samples in areas including the Outdoor Storage Area (OSA), the vicinity of the Loading Dock Area (LDA), up-gradient (hydrogeologically) locations on the site, and down-gradient locations (South Alley) on the site. These area/locations have been chosen in order to provide adequate coverage to determine the presence of potential significant source areas of further site-wide groundwater degradation. In addition to soil borings and soil sampling, groundwater samples will be collected for analysis. Groundwater samples will be collected from a combination of existing monitoring wells on the site or from monitoring wells to be installed as a part of this effort. A combination water table monitoring (shallow groundwater and light non-aqueous phase liquid [LNAPL] detection) and deeper well nests (deeper groundwater and potential dense non-aqueous phase liquid [DNAPL] detection) will be employed. Analyses of soils would consist of volatile organic compounds (VOCs), RCRA

metals, and evaluation for JP-4. Groundwater analyses will consider VOCs and JP-4 evaluation.

3.2.1 Perform Site Reconnaissance.

The respondent shall conduct supplemental site surveys as may be necessary to develop appropriate remedial design information. Such surveys may include property, boundary, utility rights-of-way, and topographic information which could affect location of SVE wells and/or pipelines.

3.2.1.1 Well Inventory

3.2.1.2 Land Survey

3.2.1.3 Topographic Mapping

3.2.1.4 Field Screening

Discuss impact of railroad right-of-way on design development. Consider what plant energy/thermal sources might exist which if the potential to incorporate exists could aid design efficiency or conserve energy

3.2.2 Conduct Geological Investigations (Soils)

The respondent shall conduct geological investigations of soils.

The geological investigation for soils will consist of the collection of surface and subsurface soil samples in conjunction with soil boring and monitoring well installation activities.

3.2.2.1 Collect Surface Soil Samples

3.2.2.2 Collect Subsurface Soil Samples

3.2.2.3 Soil Boring and Permeability Sampling

3.2.2.4 Survey Soil Gases

3.2.2.5 Test Pit (if necessary for characterization purposes)

3.2.3 Conduct Hydrogeological Investigations (Ground Water)

The respondent shall conduct hydrogeological investigations of ground water.

The hydrogeologic investigation efforts to be undertaken will involve the installation of new monitoring wells and the use of existing monitoring wells whenever possible for the collection and analysis of groundwater samples. The majority of groundwater information will be acquired from the upper portion of the saturated zone (the water table). Deeper monitoring wells will also be installed.

3.2.3.1 Install Well Systems

3.2.3.1.1 Accomplish Mobilization

3.2.3.1.2 Install Monitoring Wells

If present, the potential confining layer is reported to exist approximately between 120 and 130 feet bsg in the vicinity of Area 9/10. This is based on an ISGS drilling log for a borehole located at 2501 9th Street as reported in the "Final Remedial Investigation Report for the Southeast Rockford Source Control Operable Unit" (CDM/IEPA, July 25, 2000). Based on this information, the maximum depth of exploration for the confining layer will be 150 feet bsg.

3.2.3.1.3 Install Test Wells

In considering groundwater well installation, the respondent will be mindful of the need to help determine whether groundwater management zone remediation concepts expressed in the ROD will require enactment. Hence, in considering screening intervals, and in determining nature and extent of contamination, it will be necessary to place clusters of wells in relation to confining units as well as in shallower zones. Installation of groundwater

monitoring wells shall be constructed pursuant to Ill. Adm. Code, Part 920 of the Ill. Water Well Construction Code. The respondent will provide for the development of boring logs, well construction diagrams, and will provide a summary of these along with well development procedures.

3.2.3.1.4 Develop Wells

3.2.3.2 Collect Samples

3.2.3.3 Collect Samples During Drilling (e.g., HydroPunch or Equivalent)

3.2.3.4 Perform Hydraulic Tests as may be necessary such as slug tests or pump tests

3.2.3.5 Measure Ground-Water Elevation

3.2.4 Conduct Waste Investigation.

The respondent shall conduct waste investigations as needed to ensure appropriate waste management.

3.2.5 The respondent shall conduct geophysical investigations, as may be necessary. UTC/HS does not intend to incorporate borehole geophysics in the investigative phase of the Remedial Design. UTC/HS will consider using field screening/reconnaissance methods such as ground penetrating radar or magnetometer surveys to evaluate adjacent properties.

3.2.6 Dispose of Investigation-Derived Waste. Characterize and dispose of investigation-derived wastes in accordance with local, State, and Federal regulations as specified in the FSP (see the Fact Sheet, Guide to Management of Investigation-Derived Wastes, 9345.3-03FS (January 1992)).

Task 4 Sample Analysis

The respondent shall arrange for the analysis of environmental samples collected during the previous task.

4.1 Screening-Type Laboratory Sample Analysis

Discuss perceived role, if any, of screening sample collection/analysis prior to collecting samples to be submitted for laboratory analysis.

4.2 CLP-Type Laboratory Sample Analysis

4.2.1 Analyze Ground-Water Samples

4.2.2 Analyze Soil Samples

4.2.3 Analyze Waste (Liquid, Solid) Samples, as may be necessary

Analyses of soil samples should include total characteristic leaching procedure (TCLP) tests, pH, and organic contaminants examined for soil saturation limits for all contaminants detected through previous investigation having the potential to be hazardous waste through characteristic determination.

Task 5 Analytical Support and Data Validation

The respondent shall arrange for the validation of environmental samples collected during the previous task.

The respondent shall perform the following activities or combination of activities:

5.1 Prepare and Ship Environmental Samples

5.1.1 Ground-Water Samples

5.1.2 Surface and Subsurface Soil Samples

5.1.3 Other Types of Media Sampling and Screening, e.g., waste samples, if appropriate

5.2 Coordinate with Appropriate Sample Management Personnel

5.3 Implement EPA-Approved Laboratory QA Program

5.4 Provide Sample Management (Chain of Custody, Sample Retention, and Data Storage) Ensure the Proper Management of Samples.

The respondent shall ensure accurate chain-of-custody procedures for sample tracking, protective sample packing techniques, and proper sample-preservation techniques.

5.5 Data Validation Support.

The respondent shall ensure that all data and supporting information is accurate and defensible.

Task 6 Data Evaluation

The respondent shall organize and evaluate existing data and data gathered during the previous tasks that will be used later in the RD effort. Data evaluation begins with the receipt of analytical data from the data acquisition task and ends with the submittal of the Data Evaluation Summary Report. Specifically, the respondent shall perform the following activities or combination of activities during the data evaluation effort:

6.1 Data Usability Evaluation and Field QA/QC

The respondent shall evaluate the usability of the data.

6.2 Dat. Reduction, Tabulation, and Evaluation

The respondent shall evaluate, interpret, and tabulate data in an appropriate presentation format for final data tables. The respondent shall design and set up an appropriate database for pertinent information collected that will be used during the RD.

6.2.1 Evaluate Geological Data (Soils)

The respondent shall evaluate the geological soil and sediment data.

6.2.2 Evaluate Hydrogeological Data (Ground Water)

The respondent shall evaluate the groundwater data.

6.2.3 Evaluate Waste Data

The respondent shall evaluate the waste data, as appropriate.

6.3 Modeling

Discuss the basis and intent of any planned modeling efforts.

It is anticipated that some fate and transport modeling activities will be undertaken in support of determination and evaluation of appropriate remedial objectives for the UTC/HS portion of Area 9/10 with regard to the constituents identified during the data collection. As was done

in the SCOU RI/FS, Illinois' Tiered Approach to Corrective Action Objectives (TACO: 35 IAC 742) will be used as the basis for this modeling. Additional modeling of groundwater flow patterns may be undertaken using previously agency-accepted modeling programs such as MODFLOW. Any modeling programs to be utilized would need to be approved by EPA.

6.4 Develop Data Evaluation Report.

The respondent shall evaluate and present results in a Data Evaluation Summary Report and submit to the U.S. EPA for review and approval.

The Data Evaluation Summary Report (DESR) will provide documentation regarding the evaluation of the conditions at Area 9/10.

Task 7 Pilot Testing

The purpose of the pilot test is to assist in providing sizing and operations criteria that are used in design drawings and specifications.

In accordance with the design management schedule established in the approved RD Work Plan, the respondent shall perform the following activities:

7.1 Literature Search

For design components outside measures to be taken which fall under the category of "presumptive remedy", briefly describe the basis of applicability. The most likely usage of such design components could be with regard to any needed free-product management.

7.2 Further Develop Pilot Work Discussion

The respondent shall, within the overall RD Work Plan, further discuss the execution of and intended information to be derived from performance of one-day pilot tests concerning SVE implementation and submit it to the U.S. EPA/Illinois EPA for review and approval. Such discussion shall describe the technology to be tested, test objectives, test equipment or systems, experimental procedures, conditions to be tested, measurements of performance, and as necessary vital analytical methods, data management and analysis, health and safety procedures, and residual waste management.

Consideration will be made in the development of the pilot test effort to take advantage of the opportunity to incorporate the equipment/process into a potential remedial action effort.

Describe pilot plant installation and startup, pilot plant operation and maintenance procedures, and operating conditions to be tested. A schedule for performing the pilot test shall be included.

The following activities may be required during the performance of the pilot testing:

7.2.1 Pilot-Scale Test

The respondent shall conduct a pilot-scale test as discussed in the Work Plan. Pending scope of the pilot tests, provide further information as necessary on the following items:

7.2.1.1 Procure Test Facility and Equipment

The respondent shall procure test facility and equipment, including the procurement procedures necessary to acquire the vendor, equipment, or facility to execute the tests.

7.2.1.2 Provide Vendor and Analytical Services

The respondent shall provide vendor and analytical services.

7.2.1.3 Test and Operate Equipment

The respondent shall test equipment to ensure operation, then start up and operate equipment.

7.2.1.4 Retrieve Sample for Testing

The respondent shall obtain samples for testing as may be necessary.

7.2.1.5 Perform Laboratory Analysis

The respondent shall establish a field laboratory to facilitate fast-turnaround analysis of test samples, or, if necessary, shall procure outside laboratory services to analyze the test samples and evaluate test results.

7.2.1.6 Characterize and Dispose of Residuals

The respondent shall characterize and dispose of residuals.

7.3 Develop Pilot Test Report

In keeping with the time estimate developed in the approved Work Plan, after completion of the Pilot Tests, the respondent shall prepare and submit the methodology, results, and conclusions therefrom that describes the performance of the technology. The study results

shall clearly indicate the performance of the technology or vendor compared with the performance standards established for the site.

Task 8 Preliminary Design

Preliminary Design begins with the initial design and ends with the completion of approximately 30 percent of the design effort. At this stage, the respondent shall have field-verified the existing conditions of the site, as necessary. The respondent shall provide supporting data and documentation with the design documents defining the functional aspects of the project to prove that the completed project will be effective in meeting the remediation goals and applicable or relevant and appropriate requirements (ARARs). In accordance with the schedule established in the RD Work Plan, the respondent shall submit to U.S. EPA/Illinois EPA the Preliminary Design, which shall consist of the following subtasks:

8.1 Preliminary Design

The respondent shall prepare information that defines in sufficient detail the technical parameters upon which the design will be based. Such information shall include as necessary the preliminary design assumptions and parameters, including (1) waste characterization; (2) pretreating requirements; (3) volume and types of each medium requiring treatment; (4) treatment schemes (including all media and byproducts), rates, and required qualities of waste streams (i.e., input and output rates, influent and effluent qualities, potential air emissions, and so forth); (5) performance standards; (6) long-term performance monitoring and operations and maintenance (O&M) requirements; (7) compliance with all ARARs, pertinent codes, and standards; (8) technical factors of importance to the design and construction including use of currently accepted environmental control measures, constructability of the design, and use of currently acceptable construction practices and techniques.

8.1.1 Prepare Preliminary Drawings

The drawings and schematics shall reflect organization and clarity. The preliminary design shall include (1) an outline or listing of proposed drawings and schematics; (2) facility representations including a revised process flow diagram and a preliminary piping and instrumentation diagram; (3) a general arrangement diagram; and (4) site drawings. Engineering drawings shall be submitted in full size and half size reproductions. Standard formats for use in preparing design drawings shall be those described in the USACE Architect Engineer Manual.

8.1.2 Prepare Basis of Design Report

The respondent shall submit a detailed description of the evaluations conducted. This description shall include (1) calculations supporting the assumptions; (2) a draft process flow diagram; (3) a discussion of how implementation of the design will bring about key ARARs attainment; (4) discussion as to how to minimize environmental and public impacts; and (5) discussion for satisfying permitting requirements.

8.2 Describe Variances with the ROD

If the respondent finds that the RA being designed differs from the ROD or that an ARAR cannot be met, the respondent shall describe and highlight the issue and recommend technical solution in a memorandum to the U.S. EPA/Illinois EPA.

8.3 Land Acquisition and Easement Requirements

The need for land acquisition for access and easement requirements shall be identified and submitted as part of the design discussion. (Note - U.S. EPA presumes such easement requirements may center around on-site railroad tracks and how this impacts decisions to proceed with easement acquisition or structure design so as to minimize need for such acquisition/easement. Respondent may, of course, expand such discussion to include any other envisioned acquisition/easement areas.)

8.3.1 Identify Need and Locations

8.3.2 Provide Technical Support for Land Acquisition Efforts

8.4 Consider Energy Efficiency/Conservation Possibilities

U.S. EPA requests a brief examination of simple opportunities which may exist to reduce energy consumption once the project enters the RA and operational stages; make use of possible thermal sources at the plant which would add to SVE and/or air sparging operational efficiency; make use of more energy efficient motors/components, consider if the specification of slightly larger wiring or piping sizes might help bring about overall cost reduction through energy savings, etc. Include any pertinent discussion in 8.1.2.

8.5 Respond to Design Review Comments

Pending the nature and complexity of a design review comment, some comments may be sufficiently addressed through oral discussion, such as by conference call. Other comments may require written response. For such comments, the respondent shall consolidate and develop written response to design review comments The response shall indicate whether the respondent has decided to implement a design change as a result of the comment, and how the change will impact the RD and/or schedule. A summary of the responses to comments shall be submitted to U.S. EPA/Illinois EPA prior to initiation of the Pre-Final Design.

Task 9 Equipment, Services, and Utilities

This task includes all efforts necessary to procure long-lead equipment and/or services.

9.1 Identify Long-Lead Equipment Services and/or Utilities

The respondent shall prepare a list of any elements or components of the facility that will require custom fabrication or long lead time for procurement. The list shall also state the basis for such need, and list the recognized sources of such procurement.

9.2 Procure Long-Lead Equipment Services and/or Utilities

The respondent shall prepare necessary plans and specifications, advertise for, and evaluate bids for equipment and services.

Task 10 Prefinal and Final Design

The respondent shall submit the Prefinal Design according to the design management schedule. The Prefinal Design shall function as the draft version of the Final Design. The Prefinal Design shall address comments generated from the Preliminary Design Review and clearly show any modifications of the design as a result of incorporation of the comments. After EPA review and comment on the Prefinal Design, the Final Design shall be submitted. All Final Design documents shall be approved by a Professional Engineer registered in the state of Illinois.

10.1 Prepare Prefinal Design Specifications

A complete set of construction drawings and specifications (general specifications, drawings, and schematics) shall be submitted at the prefinal stage. All specifications shall conform to CSI format. The final design plans and specifications must be consistent with the technical requirements of all ARARs. Any off-site disposal shall be in compliance with the policies stated in the Procedure for Planning and Implementing Off-Site Response Actions (Federal Register, Volume 50, Number 214, November 1985 pages 45933–45937) and other applicable guidance.

General correlation between drawings and technical specifications is a basic requirement of any set of working construction plans and specifications. Before submitting the project specifications, the respondent shall coordinate and cross-check the specifications and drawings; and complete the proofing of the edited specifications and the cross-checking of all drawings and specifications.

10.2 Prepare Prefinal Drawings

The final submittals shall include a complete set of construction drawings and specifications as well as a set of one-half size reductions of drawings. All specifications shall conform to CSI format. For items likely to be vendor system supplied and ordered "off the shelf", vendor supplied equipment drawing may be sufficient.

10.3 Prepare Final Basis of Design Report

The final basis of design report shall incorporate any changes since the preliminary design submittal.

10.4 Prepare 100-Percent Design Submittal

The respondent shall prepare the 100 percent design submittal incorporating any comments and/or changes recommending in the prefinal design or prefinal design meeting.

(Steps beyond 10.4 needed for remedial action purposes, such as but not limited to procurement of construction contractor or vendor services, development of a CQA Plan, development of an O & M Manual, etc., would likely be a part of the next phase of negotiation for RA purposes.)

Attachment 1

Attachment 1
Summary of Major Submittals for the Source Control Remedial Design at the UTC/HS portion of Area 9/10 of the Southeast Rockford Groundwater Contamination NPL Site

TASK	DELIVERABLE	NO. OF COPIES	DUE DATE (calendar days)
1.1.2.1	RD Work Plan	3	30 days after AOC finalization
1.1.2.2.	Revised RD Work Plan	3	15 days after receipt of EPA comments
1.2.1	Health and Safety Plan (HASP)	3	Provide estimate in Work Plan
1.2.1	Revised HASP (if necessary)	3	15 days after receipt of EPA Comments
1.2.2.1	Quality Assurance Project Plan (QAPP)	3	Provide estimate in Work Plan
1.2.3.2	Field Sampling Plan (FSP)	3	Provide estimate in Work Plan
1.3.1	Monthly Progress Reports	3	In accordance with the AOC
1.4.1	Support Services Procurement	3	As subcontractors are retained
6.4	Data Evaluation Summary Report	3	Provide estimate in Work Plan
7.2	Pilot Study Discussion	3	Provide estimate in Work Plan
7.6	Pilot Test Results Discussion	3	Provide estimate in Work Plan
8.1	Preliminary Design	3	Provide estimate in Work Plan
8.5	Response to Design Review Comments	3	21 days after design review meeting

Attachment 1
Summary of Major Submittals for the Source Control Remedial Design at the UTC/HS portion of Area 9/10 of the Southeast Rockford Groundwater Contamination NPL Site

TASK	DELIVERABLE	NO. OF COPIES	DUE DATE (calendar days)
9.1	List of Long-Lead Procurement Items	3	21 days after Preliminary Design approved
10.1	Prefinal Design Specifications	3	60 days after Preliminary Design approval
10.2	Prefinal Design Drawings	3	60 days after Preliminary Design approval
10.3	Final Basis of Design	3	60 days after Preliminary Design approval
10.4	100 Percent Design	3	30 days after prefinal design comments received

**Preliminary Plans and Specifications Submittal Items:
- 8.1.1 Preliminary Drawings and Schematics
- 8.1.2 Basis of Design Report
- 8.2 Variances from the ROD

++Prefinal Plans and Specifications Submittal Items:
- 10.1 Prefinal Drawings and Specifications
- 10.2 Prefinal Drawing Reductions
- 10.3 Final Basis of Design Report
- 10.4 Prepare 100% Design Submittal

Attachment 2

Attachment 2
Regulations and Guidance Documents

The following list, although not comprehensive, comprises many of the regulations and guidance documents that apply to the RD process:

1. American National Standards Practices for Respiratory Protection. American National Standards Institute Z88.2-1980, March 11, 1981.
2. ARCS Construction Contract Modification Procedures September 89, OERR Directive 9355.5-01/FS.
3. CERCLA Compliance with Other Laws Manual, Two Volumes, U.S. EPA, Office of Emergency and Remedial Response, August 1988 (DRAFT), OSWER Directive No. 9234.1-01 and -02.
4. Community Relations in Superfund — A Handbook, U.S. EPA, Office of Emergency and Remedial Response, June 1988, OSWER Directive No. 9230.0-3B.
5. A Compendium of Superfund Field Operations Methods, Two Volumes, U.S. EPA, Office of Emergency and Remedial Response, EPA/540/P-87/001a, August 1987, OSWER Directive No. 9355.0-14.
6. Construction Quality Assurance for Hazardous Waste Land Disposal Facilities, U.S. EPA, Office of Solid Waste and Emergency Response, October 1986, OSWER Directive No. 9472.003.
7. Contractor Requirements for the Control and Security of RCRA Confidential Business Information, March 1984.
8. The Data Quality Objectives Process for Superfund: Interim Final Guidance, U.S. EPA, EPA/540/R-93/071, September 1993.
9. Engineering Support Branch Standard Operating Procedures and Quality Assurance Manual, U.S. EPA Region IV, Environmental Services Division, April 1, 1986 (revised periodically).
10. EPA NEIC Policies and Procedures Manual, EPA-330/9-78-001-R, May 1978, revised November 1984.
11. Federal Acquisition Regulation, Washington, DC: U.S. Government Printing Office (revised periodically).
12. Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA, Interim Final, U.S. EPA, Office of Emergency and Remedial Response, October 1988, OSWER Directive NO. 9355.3-01.
13. Guidance on EPA Oversight of Remedial Designs and Remedial Actions Performed by Potential Responsible Parties, U.S. EPA Office of Emergency and Remedial Response, EPA/540/G-90/001, April 1990.

14. Guidance on Expediting Remedial Design and Remedial Actions, EPA/540/G-90/006, August 1990.
15. Guidance on Remedial Actions for Contaminated Ground Water at Superfund Sites, U.S. EPA Office of Emergency and Remedial Response (DRAFT), OSWER Directive No. 9283.1-2.
16. Guide for Conducting Treatability Studies Under CERCLA, U.S. EPA, Office of Emergency and Remedial Response, Prepublication version.
17. Guide to Management of Investigation-Derived Wastes, U.S. EPA, Office of Solid Waste and Emergency Response, Publication 9345.3-03FS, January 1992.
18. Guidelines and Specifications for Preparing Quality Assurance Project Plans, U.S. EPA, Office of Research and Development, Cincinnati, OH, QAMS-004/80, December 29, 1980.
19. Health and Safety Requirements of Employees Employed in Field Activities, U.S. EPA, Office of Emergency and Remedial Response, July 12, 1982, EPA Order No. 1440.2.
20. Interim Guidance on Compliance with Applicable of Relevant and Appropriate Requirements, U.S. EPA, Office of Emergency and Remedial Response, July 9, 1987, OSWER Directive No. 9234.0-05.
21. Interim Guidelines and Specifications for Preparing Quality Assurance Project Plans, U.S. EPA, Office of Emergency and Remedial Response, QAMS-005/80, December 1980.
22. Methods for Evaluating the Attainment of Cleanup Standards: Vol. 1, Soils and Solid Media, February 1989, EPA 23/02-89-042; vol. 2, Ground water (Jul 1992).
23. National Oil and Hazardous Substances Pollution Contingency Plan; Final Rule, Federal Register 40 CFR Part 300, March 8, 1990.
24. NIOSH Manual of Analytical Methods, 2nd edition. Volumes I-VII for the 3rd edition, Volumes I and II, National Institute of Occupational Safety and Health.
25. Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities, National Institute of Occupational Safety and Health/Occupational Health and Safety Administration/United States Coast Guard/Environmental Protection Agency, October 1985.
26. Permits and Permit Equivalency Processes for CERCLA On-Site Response Actions, February 19, 1992, OSWER Directive 9355.7-03.
27. Procedure for Planning and Implementing Off-Site Response Actions, Federal Register, Volume 50, Number 214, November 1985, pages 45933-45937.
28. Procedures for Completion and Deletion of NPL Sites, U.S. EPA, Office of Emergency and Remedial Response, April 1989, OSWER Directive No. 9320.2-3A.
29. Quality in the Constructed Project: A Guideline for Owners, Designers and Constructors, Volume 1, Preliminary Edition for Trial Use and Comment, American Society of Civil Engineers, May 1988.
30. *Remedial Design/Remedial Action (RD/RA) Handbook*, U.S. EPA, Office of Solid Waste and Emergency Response (OSWER), 9355.0-04B, EPA 540/R-95/059, June 1995.

31. Revision of Policy Regarding Superfund Project Assignments, OSWER Directive No. 9242.3-08, December 10, 1991. [Guidance, p. 2-2]
32. Scoping the Remedial Design (Fact Sheet), February 1995, OSWER Publ. 9355-5-21 FS.
33. Standard Operating Safety Guides, U.S. EPA, Office of Emergency and Remedial Response, November 1984.
34. Standards for the Construction Industry, Code of Federal Regulations, Title 29, Part 1926, Occupational Health and Safety Administration.
35. Standards for General Industry, Code of Federal Regulations, Title 29, Part 1910, Occupational Health and Safety Administration.
36. Structure and Components of 5-Year Reviews, OSWER Directive No. 9355.7-02, May 23, 1991. [Guidance, p. 3-5]
37. Superfund Guidance on EPA Oversight of Remedial Designs and Remedial Actions Performed by Potentially Responsible Parties, April 1990, EPA/540/G-90/001.
38. Superfund Remedial Design and Remedial Action Guidance, U.S. EPA, Office of Emergency and Remedial Response, June 1986, OSWER Directive No. 9355.0-4A.
39. Superfund Response Action Contracts (Fact Sheet), May 1993, OSWER Publ. 9242.2-08FS.
40. TLVs-Threshold Limit Values and Biological Exposure Indices for 1987-88, American Conference of Governmental Industrial Hygienists.
41. Treatability Studies Under CERCLA, Final. U.S. EPA, Office of Solid Waste and Emergency Response, EPA/540/R-92/071a, October 1992.
42. USEPA Contract Laboratory Program Statement of Work for Inorganic Analysis, U.S. EPA, Office of Emergency and Remedial Response, July 1988.
43. USEPA Contract Laboratory Program Statement of Work for Organic Analysis, U.S. EPA, Office of Emergency and Remedial Response, February 1988.
44. User's Guide to the EPA Contract Laboratory Program, U.S. EPA, Sample Management Office, August 1982.
45. Value Engineering (Fact Sheet). U.S. EPA, Office of Solid Waste and Emergency Response, Publication 9355.5-03FS, May 1990.
46. Presumptive Remedies: Policy and Procedures, U.S. EPA, Office of Solid Waste and Emergency Response, Directive 9355.0-47FS, EPA 540-F-93-047, PB 93-963345, September, 1993.
47. Presumptive Remedies for Soils, Sediments, and Sludges at Wood Treater Sites, U.S. EPA, Office of Solid Waste and Emergency Response, Directive 9200.5-162, EPA/540/R-95/128, PB 95-963410, November, 1995.
48. Presumptive Response Strategy and Ex-Situ Treatment Technologies for Contaminated Groundwater at CERCLA Sites, U.S. EPA, Office of Solid Waste and Emergency Response, Directive 9283.1-12, EPA 5401R/023, June, 1996.

Attachment 3
November 20, 2001 Proposed Scope of Work

Please Note

Because Superfund Division does not have a current computer file of the Attachment 3-November 20, 2001 Proposed Scope of Work, we are leaving it in the overall document package as is, with 2 pencil-marked grammatical corrections at p. 7-first paragraph, 3d sentence, removal of the word "in;" and, p. 8, 3d full paragraph, 3d sentence, addition of the word "of" before "...certain chlorinated VOCs..."

The Respondent (signatory PRP) has agreed to the changes, and is aware of this.

-Russ Hart, SF Div.

-Tom Turner, ORC

January 6, 2003

PROPOSED SCOPE OF WORK
PHASE I- ADDITIONAL CHARACTERIZATION AND PRELIMINARY DESIGN INVESTIGATION FOR SOIL VAPOR EXTRACTION SYSTEM AREA 9/10 (HAMILTON SUNDSTRAND PLANTS #1 AND #2) SOUTHEAST ROCKFORD GROUNDWATER CONTAMINATION SITE

Prepared for:

Illinois Environmental Protection Agency
1021 North Grand Avenue East
Springfield, Illlinois

Prepared by:

Hamilton Sundstrand
(a subsidiary of United Technologies Corporation)
4747 Harrison Street
Rockford, Illinois

November 20, 2001

TABLE OF CONTENTS

PROPOSED SCOPE OF WORK
PHASE I- ADDITIONAL CHARACTERIZATION AND PRELIMINARY DESIGN INVESTIGATION FOR SOIL VAPOR EXTRACTION SYSTEM AREA 9/10 (HAMILTON SUNDSTRAND PLANTS #1 AND #2) SOUTHEAST ROCKFORD GROUNDWATER CONTAMINATION SITE

EXECUTIVE SUMMARY

United Technologies Corporation (UTC), parent company of Hamilton Sundstrand (HS), has prepared this proposed scope of work for the further characterization of the area surrounding the HS facility and property which are located within Area 9/10 of the Southeast Rockford Groundwater Contamination Superfund Site. This scope of work provides for the advancement of soil borings to collect soil samples, the installation of groundwater monitoring wells, groundwater sample collection, and performance of a pilot test for the design of a soil vapor extraction system to be employed based on assessment findings.

This assessment is being undertaken in order to the assist Illinois Environmental Protection Agency (IEPA) and the United States Environmental Protection Agency (USEPA) in developing further site characterization and preliminary design information to address source control issues that have been determined to be associated with the HS property in Area 9/10. The assessment activities have been designed to identify the presence and/or the effects of potential sources on the HS property within Area 9/10.

A total of approximately 22 soil borings are to be advanced on and near the HS property, including the vicinity of the former Outside Container Storage Area (OSA) and the loading dock area (LDA). In addition, seven of these locations will be completed as groundwater monitoring wells.

Overall, about 220 soil samples will be analyzed for volatile organic compounds (VOCs). Additional soil analyses for selected sample locations will include parameters such as grain size and other index properties, permeability, organic carbon fraction, etc. Groundwater

samples will be analyzed for VOCs from the seven new wells along with samples collected from thirteen other existing wells in the area.

1.0 INTRODUCTION

In reports dated July 2000 and September 2000, the IEPA has presented the results of a remedial investigation and a feasibility study that provide the basis for a proposed plan for source controls in the four targeted source areas identified in Operable Unit 3 (OU3). The proposed plan (June 2001) identified two remedial actions for Area 9/10 that focus on the Hamilton Sundstrand property. These remedial actions consist of a soil source control remedy and a leachate source control remedy. The soil source control remedy selected for Area 9/10 employs the use of soil vapor extraction technology. The leachate source control remedy selected incorporates the use of a reactive barrier wall.

UTC/HS has prepared this proposed scope of work for additional site characterization and preliminary design efforts in the vicinity of the Hamilton Sundstrand Plant #1 and the former Plant #2. The HS property is located between Ninth and Eleventh Streets, and between Twenty-third Avenue and the alley south of Plant #1 (South Alley) in Rockford, Illinois (Figure 1). This scope of work focuses on the acquisition of additional data relevant to the application of both the soil source control remedy and the leachate source control remedy. This further investigation will concentrate on three main objectives areas: (1) the Outside Storage Area at former Plant #2, (2) the loading dock area at Plant #1, and (3) the immediate vicinity of the HS property to capture the affects of other historical (potential) releases at the facility. Data collection in these areas is primarily intended to provide information for consideration of siting, preliminary evaluation and design of a soil vapor extraction system, and identification of "true soil source" conditions that would continue to degrade site wide groundwater in the vicinity of the HS property.

It is the intention of these investigations to ultimately develop appropriate remedial actions based on collection of data reflective of the current conditions. The overall effort presented herein is designed to determine if there are source materials present in the soil that continue to degrade vicinity groundwater. These source materials can be generally described as those soils above the water table whose concentrations of VOCs would migrate to groundwater and beyond the GMZs, or the presence of NAPLs.

The work to be undertaken is presented in a phased approach since the results of the initial phase(s) would be used to direct the performance of appropriate following efforts. The initial phase presented below (Phase I) consists of a collection of soil source data from identified potential sources and other areas on or near the HS property, a collection of groundwater data from the vicinity of the HS property in Area 9/10, and preliminary design activities for soil vapor extraction (SVE) implementation as a soil source control remedy.

2.0 BACKGROUND

HS has operated on this property for many years. Manufacturing operations on the site have included the storage and use of chlorinated solvents and petroleum products. The facility currently constructs fuel pumps for jet aircraft and is considered a "one-of-a-kind" operation in this manner. As a United States defense contractor, HS is subject to significant security constraints. The sensitivity to production disruption is considerable, as well as the health and safety issues, which surround the use of flammable substances such as jet fuel (JP-4), used in the operations for testing of product.

Through the course of several years of investigation by IEPA which has culminated in the "Proposed Plan Source Control Response Action, Southeast Rockford Groundwater Contamination Superfund Site," June 2001 (Proposed Plan), three areas have been suggested as being potential significant sources of groundwater at the HS Plants. The first is the Outside Container Storage area (OSA) associated with the former Plant #2, which is located north of Plant #1 at the west end of the parking lot that now covers the former Plant #2 area. The second area is the loading dock area (LDA) located along the north side of Plant #1. The third area is the Waste Recycling Area (WRA) located inside the Plant #1 facility. In addition to these three areas referenced in the Proposed Plan, additional (potential) release sources at the HS facility include the former location of several underground storage tank (USTs) that were removed from within the building in 2000, the Plant #1 Container Storage Area (CSA) and the JP-4 jet fuel USTs and piping in the South Alley.

The OSA is a formerly operated RCRA unit that has been removed from service for several years. The OSA was constructed in 1962 as a storage area for bins containing metal chips from machining operations. The OSA consisted of a concrete paved area approximately 65 feet long and 30 feet wide that sloped to a trench. The trench was a concrete lined trench that was approximately 8 inches deep extending 57 feet along the north side of the pad. The buns were placed on metal grating covering the trench and the cutting oils adhering to the metal chips were allowed to drain off into the trench. The trench was piped to an UST. The UST

was installed in 1962 during the original construction of the OSA. In the 1970's a metal roof was added to the OSA.

Other drummed wastes were stored in the OSA beginning in 1982. The OSA was the primary storage area until 1985 when the container storage area at Plant #1 was expanded. The OSA was used after 1985 for overflow storage, machine cleaning, and miscellaneous waste paint storage. In 1989, bins containing F006 wastes were stored in the OSA. This practice was discontinued as of January 1991.

The OSA was removed from service and associated UST was removed (Tank #24 or Tank#1 depending on reference source) in 1992. The concrete pad remains in place with a gravel cover to provide a level surface. The area is surrounded by a chain link fence.

Initially the OSA was considered for RCRA Part B inclusion. However, the decision was made by HS to close the unit rather than proceed with the permitting process. During the initial closure process, the presence of significant levels of chlorinated VOCs in the near surface soils was identified. This information was provided to the IEPA. Ultimately, additional closure efforts were postponed because the IEPA indicated that the since the OSA was included within Area 9/10, it was to be dealt with under CERCLA.

The loading dock area (LDA) is located in the west central portion of the Plant #1 area (Figure 1). It is a paved drive area where several USTs were formerly located. There were at least five USTs in the LDA that contained "waste oils" or spent solvent (1,1,1-Trichlorothane). All but one of the tanks were installed in 1962 and removed in 1987. One UST (Tank I) was installed in 1988. Three of the former USTs were 2000-gallon capacity systems. The fourth former UST had a capacity of 5,000-gallons.

Integrity testing of the UST systems was performed in 1987 (prior to removal) and in 1991 for the UST installed in 1988. Two of the four former UST systems failed the test. After the 1987 testing, all four of these USTs were removed. The UST installed in 1988 and tested in 1991 was determined to be sound.

The WRA is an area located inside Plant #1 that was used from approximately 1975 until 1992 for the recycling of 1,1,1-TCA (Figure 1). The 1,1,1-TCA recovery unit covered an area of approximately 200 square feet (10 feet by 20 feet). The unit was placed on the concrete floor within in the building. In 1984, a concrete curb was added which surrounded the entire area as a secondary containment structure. The recycling unit was Phillips Still model AV8541. There were two air driven diaphragm pumps also used in the operation. The 1,1,1-TCA to be recycled was approximately 90 percent 1,1,1-TCA and ten percent oil and grease.

The used 1,1,1-TCA was transferred from operations equipment (primarily vapor degreasers) into 55-gallon drums or a vacuum tank truck and delivered to the WRA. The solvent was then transferred to a 600-gallon stainless steel aboveground holding tank that was hard-piped into the still. The resultant reclaimed solvent was then transferred to a second 600-gallon stainless steel holding tank. The reclaimed solvent was used in other operations on the site, most commonly cold cleaning activities. Residuals and still bottoms were transferred to drums and properly disposed. There have been no reported releases from the former WRA. The area where the WRA formerly existed has since been incorporated into other plant operational use.

In addition to these three areas identified in the Proposed Plan by IEPA (June 2001), other potential historical source areas have been identified at the HS facility. These other potential historical source areas are associated with past operations equipment and/or operational issues (leaks and spills) encountered and reported to the IEPA over the years by HS personnel.

During construction activities for the placement of product testing equipment in 2000, several abandoned USTs were encountered. These USTs were found to exist in an area located south of the loading dock within Plant #1 in side the building. Based on historical site development, these USTs were once located outside of the building walls. The on grade construction of the building addition either did not present a need to remove the USTs at that time, or their presence was unkown. To facilitate construction, these USTs were removed in 2000. During removal effort a leaking underground storage tank report of a release ~~release~~ was made and

incident number 200001409 was issued by the Illinois Emergency Management Agency (IEMA). Some of these former USTs contained chlorinated VOCs.

There were six USTs removed in this effort in July 2000. The USTs ranged in capacity from 1,100 gallons to 6,000 gallons. The tanks were determined to have contained either used oil, solvent, gasoline, or lubricating oil. It was determined that three USTs that contained used oil, lubricating oil, and solvent had signs of releases. Upon discovery and subsequent removal, the USTs were found to have been previously abandoned by filling the UST cavities with sand. Some free liquids were found within some of the tanks. The removal operations were observed by an Illinois State Fire Marshall inspector.

Approximately 50 cubic yards of impacted soil was removed from the UST area for disposal. A concrete hold-down pad was found to exist below the backfilled sand surrounding the USTs. Due to the thickness of the pad (approximately 12 inches) and the limitations of the inside work area, the pad was inspected and left in place. There was no evidence of cracks or failures in the hold-down pad.

Soil samples were collected from the excavated area. Analyses performed included VOCs. The highest concentrations certain chlorinated VOCs detected included tetrachloroethane (PCE) at 4.640 mg/Kg, 1,1,1-TCA at 7.130 mg/Kg, cis-1,2-dichloroethene at 3.180 mg/Kg, and trichloroethene (TCE) at 4.580 mg/Kg.

The 2000 LUST area was backfilled and product test stand equipment was erected in the area. The LUST incident remains open at this time.

As noted previously, the HS facility utilized a container storage area within Plant#1 (CSA). This area was used to store a variety of hazardous waste products including spent solvents. The CSA was located within the building. A RCRA Part B permit application was prepared and submitted to IEPA for this storage area initially in 1989. After several subsequent revisions and responses, the Part B Application process was ceased and the area would not be permitted. The CSA was located off the east side of the LDA within the facility.

Beyond the bounds of CERCLA/SARA authority, HS has historically and continues to utilize significant quantities of petroleum products, specifically military jet fuel (JP-4). Leaks and/or spills from underground storage and transmission of JP-4 over the years have resulted in the majority of the reported releases from the facility. As a result of such a release discovery and report to IEPA, HS had instituted remedial actions involving recovery of JP-4 in the eastern portion of the South Alley (Figure 1). Product removal efforts and soil excavation and disposal were undertaken in response to a significant release (actual quantity unknown) of JP-4 in the South Alley that was discovered in 1988. In 1989 and 1990 eight monitoring wells and three of these wells were outfitted with skimmer pump product recovery systems. Some monitoring/recovery wells used for the JP-4 release mitigation efforts and other historical investigations will be evaluated and potentially used in the groundwater assessment portion of this Phase I characterization.

With respect to the conditions presented by the HS plant with regard to the potential areas of concern, the proposed investigation efforts have been focused on assessing direct or indirect effects of potential sources of further groundwater degradation by VOCs. Direct assessment will employ investigation efforts (soil boring and monitoring well installation) in the area of concern. Indirect assessment will use investigation efforts to measure the effects of a release or source should they be present. These indirect assessment efforts are deemed to be the appropriate means by which to collect the necessary information while providing for overall personnel and facility safety and security.

3.0 PHASE I CHARACTERIZATION AND PRELIMINARY SVE DESIGN

The following sections provide a brief discussion and rationale for the acquisition of pertinent information with regard to identification of potential sources of further groundwater degradation, an assessment of those potential source impacts, and initial design efforts to provide for soil source remedial actions (SVE).

3.1 Vadose Zone Soil Source Characterization

Based on the need for direct and indirect assessment scenarios, two soil sampling protocol are proposed for determination of the presence and characterization of soil source materials. These sampling scenarios consist of an intensive sampling regime for the OSA and the LDA (direct) and a more traditional soil sampling regime for the other areas surrounding the HS facility (indirect). The rationale for the different sampling protocol lies in that the OSA and LDA have been identified as potential source areas. Therefore, an aggressive approach to verification of conditions in these locations is deemed appropriate. The more traditional sampling approach will be employed on those areas surrounding the HS facility where data to be collected would more likely to demonstrate "affects" from a source, rather than source materials themselves.

The sampling scenario proposed for the OSA and the LDA areas are consistent with protocol for determination of remedial action objectives using Title 35 Illinois Administrative Code Part 742 (TACO). In accordance with TACO, certain soil contaminant concentrations can be averaged, provided adequate sample analyses are performed. TACO requires that one soil sample be analyzed for each two-feet vertical interval of an impacted area if averaging over the soil column is being used for evaluation of the soil component of the groundwater ingestion route. The resulting concentration for that location can then be applied to established baseline (Tier 1) standards, or be used in Tier 2 or 3 analyses to determine the appropriate corrective action levels.

It is proposed that twelve soil borings (S-1 through S-12) be advanced to approximately 30 feet deep (to the water table) to collect continuous soil samples in the areas of the OSA and LDA. Eight of the soil borings (S-1 through S-8) will be advanced in the OSA area, and four (S-9 through S-12) will be advanced in the LDA (See Figure 2). In the OSA area, two borings will be located centrally where the highest contaminant concentrations have historically been reported to exist. Actual locations will be reviewed with plant personnel and be screened with subsurface utility designation and location methods to help provide appropriate protection of infrastructure items. Proposed locations are shown in Figure 2.

Discrete soil samples will be analyzed for VOCs on two-feet intervals from the surface to the end of each boring in both the OSA and LDA. This sampling effort will provide additional data for the development of three-dimensional images of VOC contamination of the vadose zone within the OSA and the LDA.

The more traditional sample collection effort will consist of 10 additional borings to be positioned on and near the HS Plants to assess the conditions that may indicate that a continuing source of groundwater impact (through soil migration) would be present from other potential sources in and around the HS plants (e.g. WRA, interior 2000 LUST area, other process areas, etc.). Due to safety and accessibility considerations within the operational buildings, these additional borings are proposed in locations which generally surround the facility. These borings locations, S-13 through S-15 and SMW1 through SWM7, are shown in Figure 2.

Soil samples from these borings will be collected on a continuous basis. Screening with a field photoionization detector (PID) will be conducted to help identify the presence of contaminants and to aid in the selection of samples for laboratory analyses for volatiles. Up to three samples from each boring will be selected for analysis based on the PID data, odors, and other field observations. All soil sampling will be performed in accordance with appropriate USEPA publication SW-846 Method 8260.

In addition to the chemical analysis, approximately eighteen Shelby tube or split barrel samples will be collected for physical soil analysis from selected companion borings. Physical soil analysis will include organic carbon, grain size, index properties, hydraulic conductivity, and permeability to accommodate TACO (Tier 2) analyses and for use in SVE evaluation and design.

Prior to placement or siting of all drilling locations, a review of the available information consisting of historical aerial photographs, utility and other infrastructure data, and existing historical soil and groundwater data will be performed. This data review will be undertaken to provide information on both the potential for source areas (pits, fill areas, drums, tanks, etc.) and migration pathways, but also to provide a higher level of confidence for the safe placement of drilling locations and the overall work efforts. A subsurface utility location service will be used to designate, and if necessary, to pre-locate potential location conflicts. In general, however, the South Alley area itself will be avoided due to the presence of multiple subsurface conflicts and the limited availability of precise location information.

3.2 Groundwater Characterization

Groundwater characterization activities will be undertaken to further address soil source conditions and the proposed leachate source control remedy component of the remedial actions for Area 9/10. Activities will be directed toward identifying/confirming the presence of impacted groundwater within the upper portion of the unconsolidated aquifer, and determining whether a source of groundwater impacts indicative of NAPL or a significant soil source exists within the vicinity of the HS Plants.

As prescribed with the soil boring procedures described above, prior to placement or siting of drilling locations, existing data will be reviewed and subsurface utility concerns will be addressed. Due to the presence of multiple subsurface conflicts and the limited availability of precise location information on much of the underground structures, sampling efforts in the

South Alley will focus on the use of existing monitoring points installed previously for JP-4 monitoring and recovery efforts.

Groundwater characterization efforts will consist of the installation of shallow groundwater monitoring wells. New monitoring well locations will consider primarily the areas hydraulically up and down gradient of the HS property. Attention will be placed on the location of existing monitoring well MW201 whose historical sample result was determined by the IEPA to signify the presence of NAPL in the vicinity of the HS property. The combination of new monitoring wells and existing monitoring wells will be located south, southwest (assumed down gradient) and east and north (assumed up gradient) of the HS property. Actual monitoring well locations will be determined based on a variety of issues/concerns including public/private access, infrastructure, existing buildings, etc. Probable locations for wells SMW-1 through SMW-7 are shown in Figure 2. These locations will be co-located with borings proposed in Section 3.1 above, thus eliminating separate bore holes for well installation at some locations.

Monitoring wells will generally be screened within the upper 10 to 15 feet of saturated thickness of the unconsolidated (sand) aquifer. Therefore, the total anticipated depth of the shallow wells would be between 45 and 50 feet (from ground surface). Groundwater is anticipated to be encountered between 30 and 35 feet in the area. At this time, approximately six new monitoring well locations are proposed. Three of these wells will be located on the presumed up gradient portions of the HS property. The remaining three locations will be positioned on the presumed down gradient side of the area (Figure 2).

Soil samples will be collected during the advancement of borings prior to monitoring well installation as described in Section 3.1 above. The sampling protocol to be used in conjunction with the monitoring well locations would be that of the more traditional protocol.

Groundwater monitoring wells will be constructed of appropriate materials in accordance with IEPA and USEPA protocol. All groundwater sampling will be performed in accordance with appropriate USEPA publication SW-846 methods. Groundwater samples will be analyzed for

VOCs (Method 8260). Well locations will be surveyed and correlated to existing monitoring well network survey datum (mean sea level - MSL). Slug testing will be conducted in selected wells to assist in estimating field hydraulic conductivity.

Concurrently with sampling of the newly installed wells, it is proposed that some existing wells be made available for sampling. For example, monitoring wells MW-4, MW-2, and MW-5 in the vicinity of the former Midstates facility, MW202 and MW203 and MW201 of the site wide monitoring well network, and MW127 (not shown on Figure 2) from the earlier IEPA investigation activities would be proposed for sampling and other data collection. In addition, monitoring and recovery wells associated with former JP-4 release mitigation and monitoring in the South Alley and previous investigations will be re-evaluated for sampling use (RW-1, RW-2, RW-3 MW3-FGA, and MW7-FGA). These existing wells, with the exception of MW-127, are shown on Figure 2.

3.3 Soil Vapor Extraction Pilot Test and Preliminary Design

A previous closure strategy for the OSA had incorporated the use of SVE. To this end, a series of pilot tests had been performed (circa 1992). These initial tests provided a basic acknowledgement of SVE as an applicable technology for removing VOCs from vadose zone soils in the vicinity of the OSA. With this historical basis, a series of design-oriented pilot tests will be performed in those areas (inclusive of the OSA) where assessment results (directly or indirectly) indicate the presence of a soil source of further groundwater degradation. The performance of these pilot tests will use the lithological information obtained during the assessment to determine the number and location of screened intervals within each test area. It is anticipated that at least two test areas will be evaluated. One area will be the OSA and the other area will likely be located to the south southwest of the HS property.

Pilot test protocol will provide for the collection of those data essential for appropriate design and ultimate implementation of a field SVE system. Information to be collected will include flow rates, vacuum (pressure), temperatures, moisture, influent/effluent VOC concentrations,

and radial influence measurements. Based on known conditions at the site, test durations would not exceed one day per test.

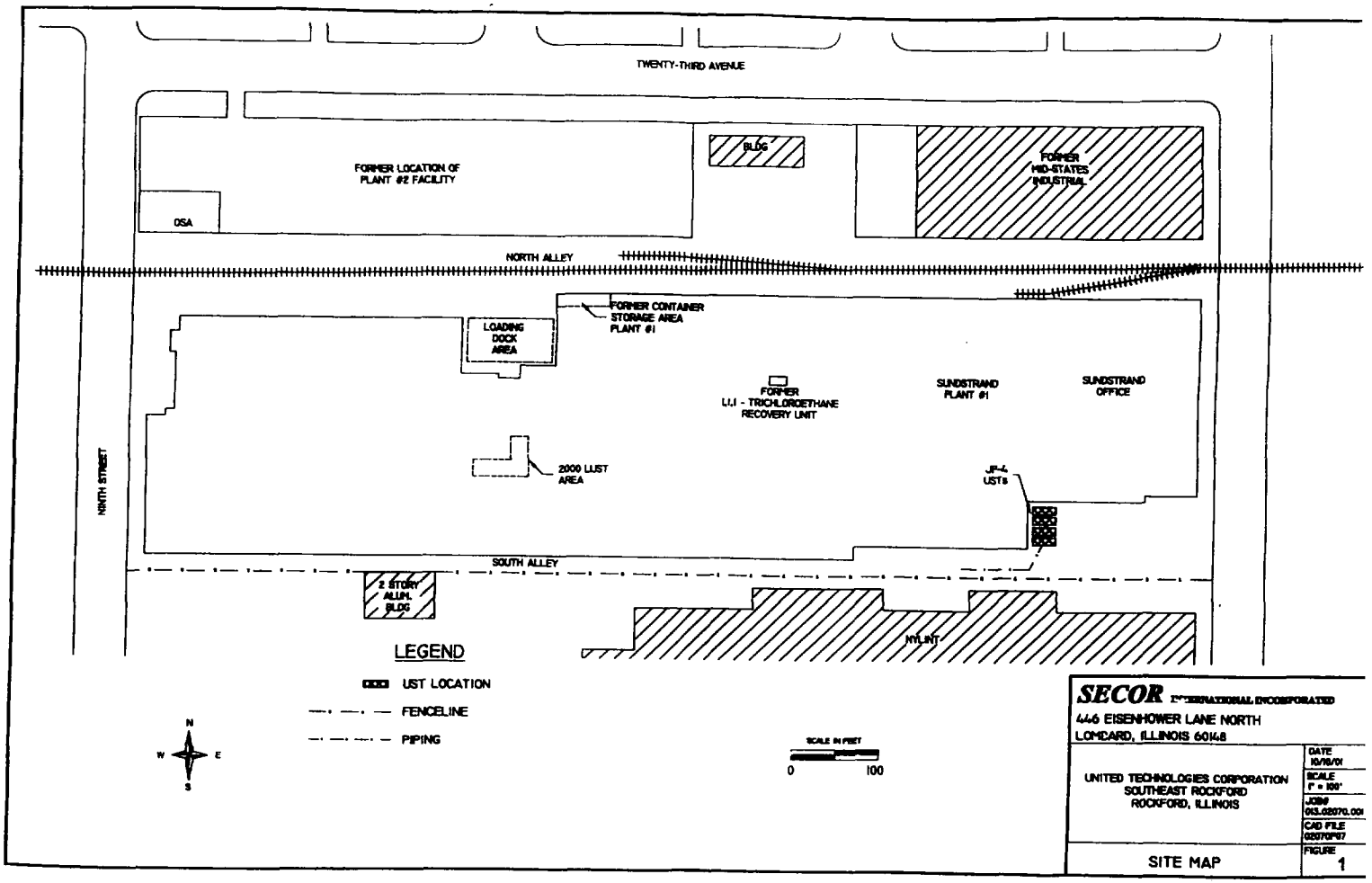
Based on the data collected and the subsequent evaluation, design efforts would be undertaken. As part of the design effort, HS would employ the use of "green concept" engineering principles in equipment specification, selection, and operation. Because this is an operational manufacturing facility, there are already sources of energy (used, under-utilized, and even unused) that may be able to be directed towards efficient implementation of the SVE system. As well, the operation of the SVE system can produce energy through it's own performance (thermal) which could be redirected into beneficial use within the system or within the HS Plant. UTC, throughout it's own organization, practices and promotes the use of green engineering in both its manufacturing operations and the commodities they produce.

4.0 DELIVERABLES

It is anticipated that a number of specific deliverable items will be required to provide adequate documentation of efforts to be undertaken, commensurate approval of those efforts, and presentation of results (progress status and final). The initial deliverable, upon agreement of the conceptual scope of work, would be a Work Plan. The Work Plan would contain the appropriate components (e.g. scope of work, sampling and analysis plan, quality assurance/quality control plan, health and safety plan, etc.). Beyond the Work Plan, progress memorandum with regard to the implementation of the Work Plan would be provided. Ultimately, a final (pre-design investigation) report with the results of the characterization and preliminary SVE evaluation design effort would be submitted. This pre-design report would likely include discussion on the need and/or manner to address free-product (if encountered), apply a direct removal (excavation) approach to hotspot reduction, and present an implementation strategy for SVE as well as any recommendations for Phase II characterization activities and/or additional design investigation.

5.0 SCHEDULE

UTC/HS is prepared to embark on the efforts proposed herein upon concurrence from the IEPA and USEPA. Providing a scope of work is agreed upon in timely manner, UTC/HS proposes to initiate the field data collection efforts in the Spring of 2002. This field milestone would be predicated on the preparation by UTC/HS and approval by IEPA/USEPA of the necessary project plans (Work Plan) during the time period from December 2001 through February 2002. The performance of the field investigation efforts should be completed within a 60 to 90 day time period from initiation. Based on field observations and preliminary results that would be provided to the IEPA/USEPA through progress memoranda, initial design efforts may begin on an SVE remedy with IEPA/USEPA concurrence. The final report for the characterization and preliminary design investigation for SVE would be prepared and submitted by the end of the third quarter of 2002 (October).

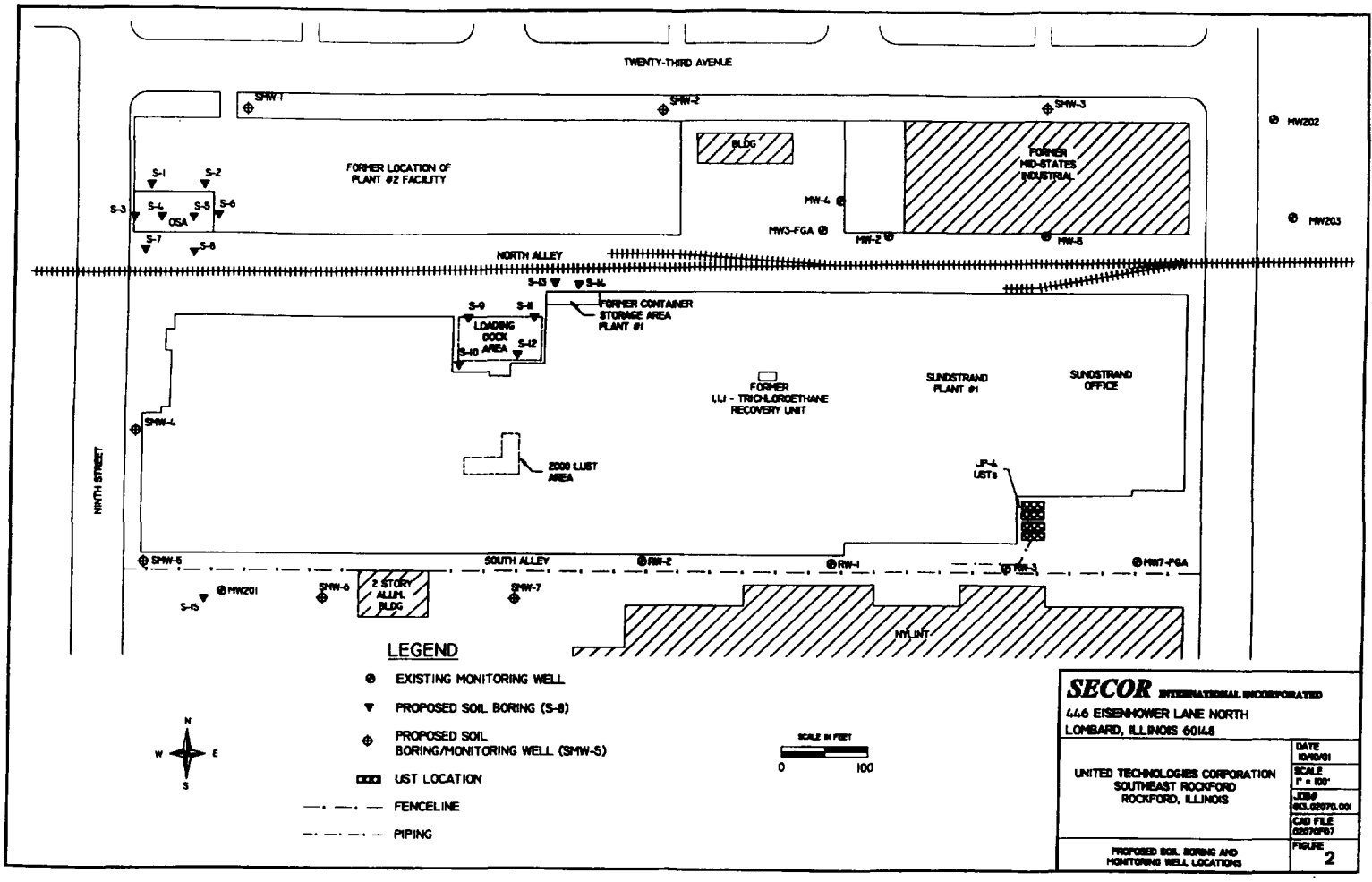


SECOR INTERNATIONAL INCORPORATED
446 EISENHOWER LANE NORTH
LOMBARD, ILLINOIS 60148

UNITED TECHNOLOGIES CORPORATION
SOUTHEAST ROCKFORD
ROCKFORD, ILLINOIS

DATE 10/16/01
SCALE 1" = 100'
JOB# 063.05570.001
CAD FILE 05570F07
FIGURE 1

SITE MAP



SECOR INTERNATIONAL INCORPORATED
446 EISENHOWER LANE NORTH
LOMBARD, ILLINOIS 60148

UNITED TECHNOLOGIES CORPORATION
SOUTHEAST ROCKFORD
ROCKFORD, ILLINOIS

DATE 10/19/01
SCALE 1" = 100'
JOB # 063.026975.001
CAD FILE 026975F07
FIGURE 2

PROPOSED SOIL BORING AND MONITORING WELL LOCATIONS